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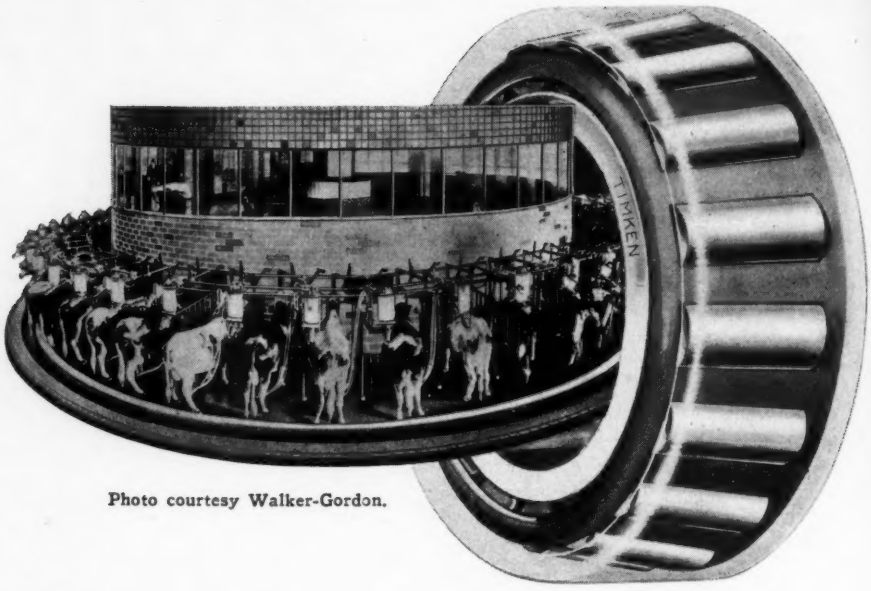

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Editorial Offices: 19 West 44th Street, New York

VOLUME XVII NUMBER FIVE

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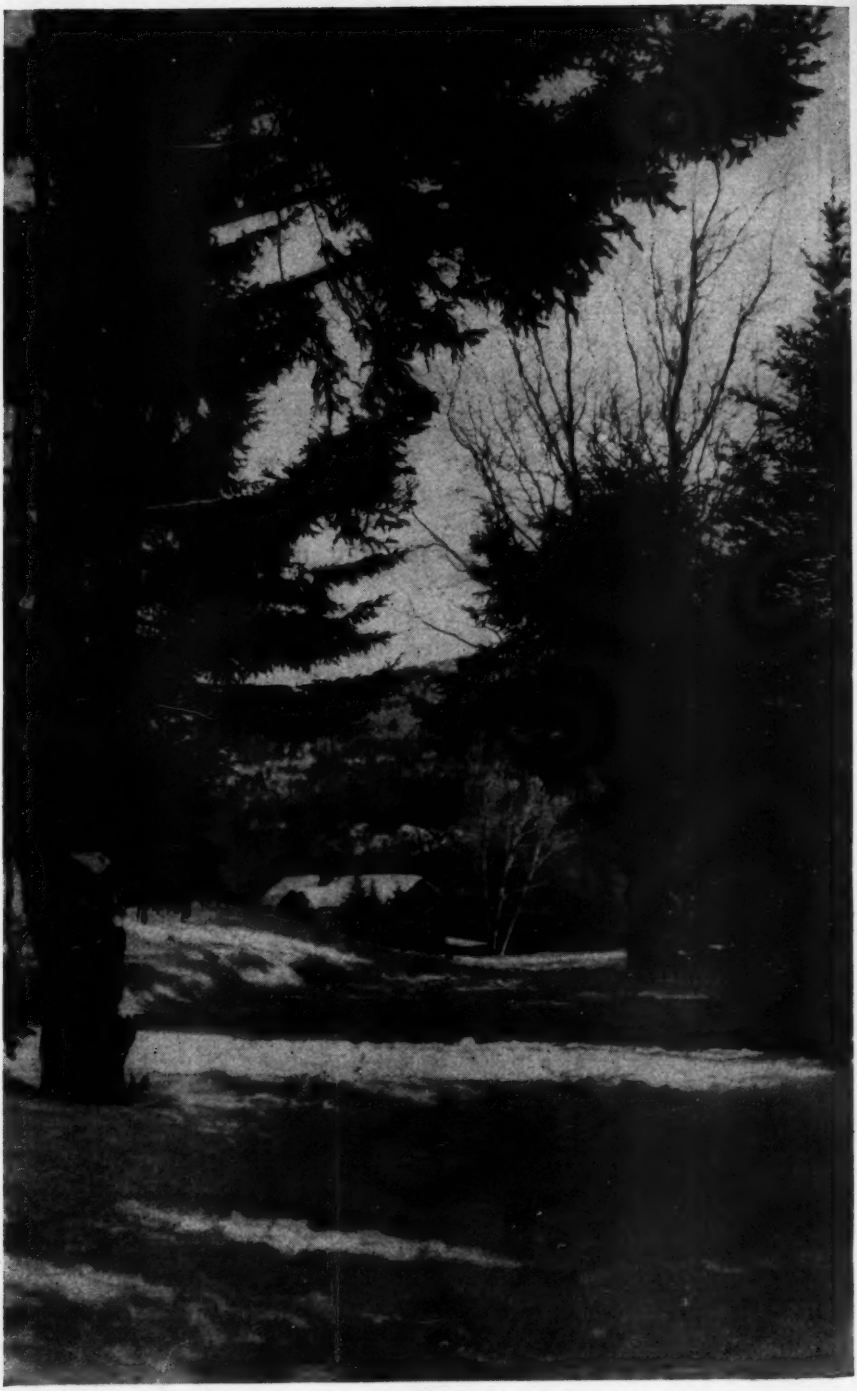

SERENITY

Better Crops with PLANT FOOD

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VOL. XVII NEW YORK, DEC.-JAN., 1931-32 No. 5

May Christmas bring you—

Serenity

By Jeff McDermid

SINCE calmness of spirit is at a premium among many of the folks I meet after the mental pressure incident to the times we survive in, I seek it in one traditional place of peace—the cemetery. I go there to kick through the autumn leaves and read the epitaphs above those who lived in former eras of calamity howling. I come in no morbid mood, however, for there is strength in granite and hope in marble.

Here is serenity indeed. I am unable to recast any elegy that will do justice to the sweet indifference with which the cemetery city is infused. I stumble over a grubby tombstone in memory of an outcast tramp, buried at the town expense back in the days when liquor was flowing in every street. I glimpse a lonely grave under the alders, marking the last haven of a Civil war female spy, who died suddenly after a lecture at our old "opry house." I scan the towering shaft over the mausoleum of a miserly old money lender who owned more good deeds than he ever performed. Just around the bend of the drive is the grave of a widow who died fighting two mortgages and the malaria. Here is the resting place of a veteran

who served for thirteen dollars a month and came home convinced that both he and his country got a bargain. Beside him lies his eldest son, shot in Argonne forest so that the world might be safe for something. Then there lies the schoolmate who sought serenity in suicide because he didn't have imagination enough to provide it on this side of Jordan.

When I was a youngster it was my vacation job to rake lawns and help dig an occasional grave for our local sexton. I never shied at cemeteries and never believed in ghosts. In other words, I am right at home in a burying ground. (You may have noticed this trait before if you have followed my rambles across many rules of rhetoric.) So when I want to feel young again and quite serene, I turn aside from the crepe-hanging atmosphere around me and go out among the graves.

THE uncertainty of life itself, the hidden events veiled in the turn of the road, instead of making one dolorous, give me that serenity which I sought as I entered the bronze gate. And this is the reason:

Whereas we know not what destiny has in store for us tomorrow in matters of life and limb, is it not absurd to spend our present domestic hours in economic foreboding over the task or the tithe to come? Americans have apparently forgotten that humanity never knows the future anyhow. They have been reading too many of those optimistic stock-boosting or real-estate circulars, and the almighty dollar obscures both the rising and the setting sun. Always grander tomorrows, never contented todays. Even though I might be on the mountain peak of prosperity, sudden night could overtake me in the midst of my rejoicing. Like a child on the nursery floor, let's try to be happy with the battered toys we possess, for no man can foretell the approach of croup or bellyache.

I got that from a trip to the churchyard. They say the dead never speak—unless you know their language, which is the same as that of the birds, the trees, the withering flowers, and the pulse of the autumn wind. In fact, what the dead say is as plain as the books they have written, the children they have begotten, and the property they have accumulated and finally found useless:

"Eat" (with moderation) "drink" (with discrimination) "and be merry" (with Christmas cheer) "for tomorrow you die."

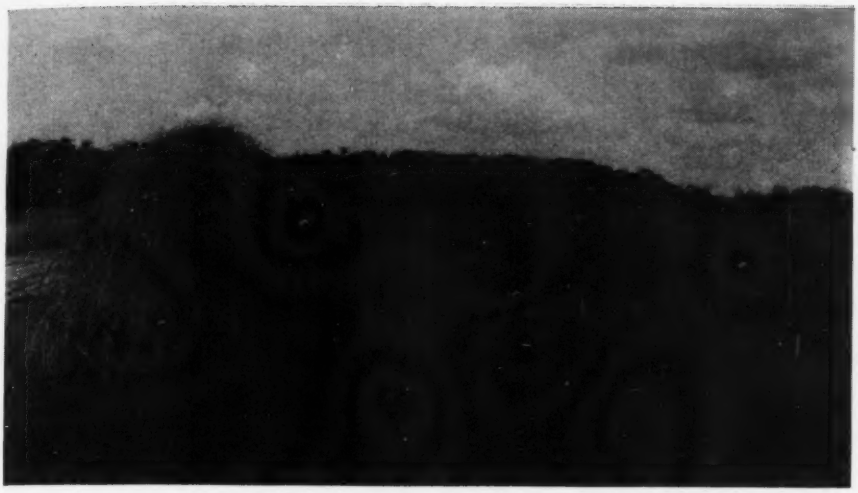
Adjacent to the cemetery, quite handy for my purpose, is a hospital for crippled children. Casting my eyes that way, I recall the brave serenity of its inmates, with their racking pain and deformity. Then is it true that we must hunt for the lost jewel of heart's ease either in the city of death or the wards of despair?

But as I ponder at this state of affairs and search for Christmas comfort, the parish parson comes pacing through the churchyard and sits down upon a mossy slab, chiseled in honor of a defunct banker who thought well of memorials but knew nothing at all of moratoriums.

NOT "being encompassed about with a crowd of witnesses," I decide this is a good time and place to confess the blunders of my part of the universe to a sympathetic ear. I had no intention of castigating this generation or predicting utter chaos to come, like H. G. Wells and other disciples of damnation. My folks had been brought up in Free Methodist camp-meetings, so that horrid implications of dismal destiny affect me not. Hell fire and ruin are easy to predict, but some folks have to be scared into sanctity and stampeded into serenity. I still believe that there is room in the world for other than soldiers, capitalists, and economists, so I proceed to confess my simplicity and confirm my serenity beside the sky-pilot seated on the grave of another departed cashier.

"What do you make out of Christ-

(*Turn to page* 60)



Timothy hay: left, fertilized with NPK; right, fertilized with NP only.

The Response *of* Oats *and* Hay *to* Complete Fertilizers

By P. O. Ripley

Dominion Experimental Station, Lennoxville, Quebec

SOME 10,844,640 acres of hay are grown in Canada annually. This represents more than 20 per cent of the total area devoted to farm crops in the Dominion, according to reports of the Dominion Bureau of Statistics. With such a large area devoted to the crop, it assumes a position of sufficient importance to be worthy of a great deal of consideration.

Unfortunately, in the past, too little attention has been paid to the care and management of hay. In recent years, in order to economize in labor, many farmers in Eastern Canada have curtailed the production of such crops as grain, corn, and roots, which require comparatively high labor expenditure, and have allowed their farms to "run" in hay. In this way costs have been reduced, but, unfortunately, cash returns from crops also have been lowered. This lowering of returns has been aggravated by the neglect of the hay crop itself. The average yield of hay in the Dominion is only 1.57 tons per acre, which is unnecessarily low.

This low yield has been brought about by two general factors. In most cases, the hay has been allowed to continue too long before breaking up and reseeding. Furthermore, little if any fertility has been returned to the soil to replace that removed in the crop, and the soil has become depleted of the more essential plant food elements necessary for maximum production.

In 1923, an experiment was started

at the Dominion Experimental Station, Lennoxville, Quebec, with the object of devising some practical method of increasing the fertility of the soil, in order to produce higher yields of hay with as little expenditure of labor and capital as possible.

One-twentieth acre plots were laid out in a four-year rotation of oats, clover, timothy, timothy. One such rotation was treated with a light application of commercial fertilizer applied to the last two years in hay. The fertilizer consisted of 75 pounds of nitrate of soda and 200 pounds of superphosphate. At this time it was thought that potassium was present in the soil in sufficient quantities to meet the requirements of the crop.

A second set of plots received, on the last two years in hay, a heavy application of 150 pounds of nitrate of soda and 400 pounds of superphosphate. On a third series of plots, the same rotation was followed, but the series served as a check and received no fertilizer. Each of these rotations and treatments was carried out in duplicate.

The crop yields for each year from 1923 to 1930, together with the average for the period, are shown in table I. The yields are the average from duplicate plots.

A study of this table reveals several very interesting and important observations. In the first place, there appeared quite a pronounced increase in the yield of all three hay crops, in the second, third, and fourth years after fertilizer was applied to the two timothy crops. The increase was only slightly noticeable in the case of clover. The check plots, receiving no fertilizer, showed a slight increase also, which would appear to indicate that part of the above increase was due to more favorable climatic conditions in these years.

The oat crop showed a decided falling off in yield in 1925 and 1926, with a considerable increase in 1927, again falling off in 1928, 1929, and 1930, much below the yield before fertilizers were used at all. Due to the fact that there was no "catch" of clover in 1930, a mixture of oats and peas was substituted as a hay crop, and is recorded as such in the table.

TABLE I

OATS

	1923	1924	1925	1926	1927	1928	1929	1930	7-year average
Light		31.2	30.9	38.4	48.2	35.6	27.4	20.9	33.2
Heavy		45.3	35.9	36.4	56.0	36.9	33.6	19.4	37.6
Check		45.9	33.5	24.7	36.8	25.2	18.2	8.8	27.6

CLOVER

								Oats and Peas	8-year average
Light	.42	.89	.92	.66	0.96	0.75	1.12	2.23	0.99
Heavy	.42	2.01	1.56	.94	1.19	1.64	1.35	2.38	1.44
Check	.86	.98	1.44	1.08	1.00	1.03	1.32	2.30	1.25

TIMOTHY

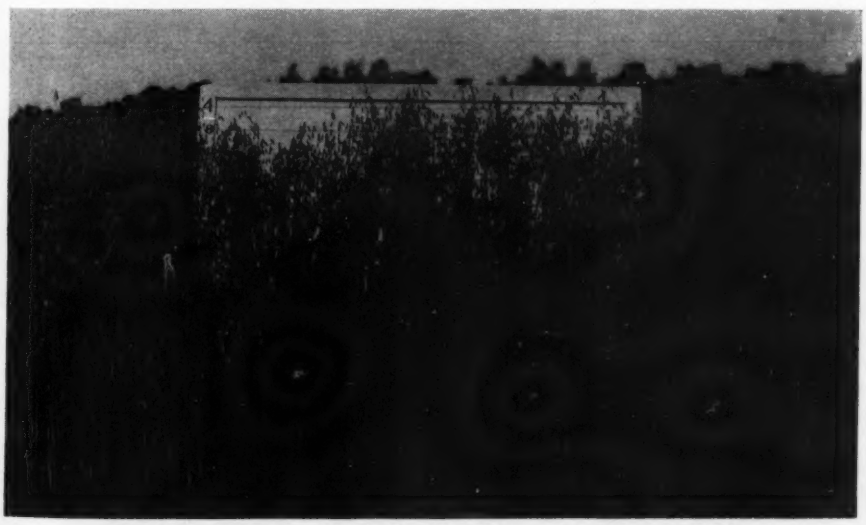
Light	0.66	1.02	1.36	1.36	1.37	1.15	1.36	0.84	1.14
Heavy	1.01	1.78	2.33	2.13	1.79	1.81	2.14	0.99	1.75
Check	1.33	1.21	1.00	1.51	1.21	1.00	1.33	1.18	1.22

TIMOTHY

Light	0.47	1.07	1.72	1.18	1.29	0.99	1.26	0.43	1.05
Heavy	0.92	1.28	2.05	2.22	2.02	1.38	1.24	1.07	1.52
Check	0.49	1.24	1.25	1.01	1.43	1.22	0.62	0.97	1.03

These oats were fertilized with NP only and the yield was 31.2 bushels per acre.

These variations in yield of the different crops indicate the comparatively low "carry-over" capacity of the commercial fertilizers used. The timothy crops to which the fertilizer was applied showed some response. This is especially true of the heavy application. Oats and clover, one and two years removed from fertilizer applications, showed practically no beneficial effects from the treatments, and in fact produced steadily diminishing yields as the period of the experiment advanced. The "carry-over" of the fertilizer applied to the timothy crops was apparently so slight that, in addition to the low yields of oats and clover each year of the experiment, in 1929 there was not enough fertility in the soil to produce a "catch" of clover for 1930, and hardly a single plant survived after germination. Although timothy showed some response to fertilizer, the increase in yields was



The yield of these oats, fertilized with NPK, was 62.4 bushels per acre.

not high enough to warrant the expenditure for fertilizer used, although, in all cases the heavy application produced yields considerably higher than the check.

After seven years' tests, it was felt that the adopted system of fertilizing was not satisfactory and that it was useless to continue attempting to fertilize the timothy crop, when the seeding earlier in the rotation failed to "catch" and therefore left no hay to fertilize. Accordingly, in the spring of 1930, it was decided to add muriate of potash to the nitrate of soda and superphosphate on one-half the area in each of the fertilized timothy plots, leaving the other half the same as before to serve as a check. Fifty pounds of muriate of potash were added to the so-called light application and 100 pounds to the heavy application.

As the crops directly affected in 1930 were the two timothy crops to which the fertilizers were applied, only the yield of these crops are shown in table II.

The yields on those plots receiving only nitrate of soda and superphosphate were actually lower than the check, except in the case of the heavy application on the second crop of timothy, and even here the increase was only one-tenth of a ton, which is almost negligible. The first year muriate of potash was applied increases in crop yields were recorded, which would seem to suggest that this constituent had apparently been one of the limiting factors in the fertility of the soil.

The light application of complete fertilizer showed an increase in yield, over nitrate of soda and superphosphate only, of 0.33 of a ton on the first timothy crop, and 0.55 of a ton on the second. The heavy application of complete fertilizer showed a

(*Turn to page 57*)

TABLE II

Plots	Treatment*	Crops and Yields: Timothy	Timothy
		tons	tons
1-A	75 lbs. N., 200 lbs. P. applied	0.40	0.22
1-B	to last two years in hay	1.28	0.64
	Average of duplicate plots	0.84	0.43
2-A	75 lbs. N., 200 lbs. P., 50 lbs. K. applied	0.60	0.72
2-B	to last two years in hay	1.74	1.24
	Average of duplicate plots	1.17	0.98
3-A	150 lbs. N., 400 lbs. P. applied	0.64	0.86
3-B	to last two years in hay	1.34	1.28
	Average of duplicate plots	0.99	1.07
4-A	100 lbs. N., 400 lb. P., 100 lbs. K. applied	1.62	1.40
4-B	to last two years in hay	1.92	2.82
	Average of duplicate plots	1.77	2.11
5-A	No fertilizer applied	0.76	0.43
5-B	Check—no fertilizer applied	1.61	1.51
	Average of duplicate plots	1.18	0.97

* N = Nitrate of Soda; P = Superphosphate; K = Muriate of Potash.

Industries Become Garden-minded

By H. E. Young

Purdue University Agricultural Extension

A view of the industrial gardens of the Studebaker Corporation at South Bend, Indiana.

SURPLUS labor, brought about by expansion and mechanization, is the bugbear of American industry. The time was when commercial interests thought largely in terms of factory production. Output and sales consumed the entire time and attention of expert executives and their boards of directors.

But not so in modern industry. New problems are now demanding and receiving serious consideration. The interest and welfare of employees, and the obligation of industry to its workers, are being recognized as never before.

Forced to initiate the shorter day and week, far-sighted industries are experiencing a deeper concern for their employees and are extending valuable help and cooperation to supplement the pay envelope. Important among these newer forms of cooperation with industrial workers is the Industrial Garden movement — a movement which is proving remarkably beneficial to both employees and employers.

The industrial garden for company employees is a sensible and logical move. With the income of many industrial workers too small to maintain the usual standards of living, the industrial garden for company employees serves a three-fold purpose. It supplements an inadequate industrial wage, provides a part of an otherwise impossible family food supply, and contributes to the general welfare and independence of the workers—all of which, everyone will agree, are especially desirable in times of business depression.

Not a New Project

Garden-minded industries are not entirely new in Indiana. A number of the leading industries in this State are sponsoring industrial gardens for their employees. We have yet to learn of an instance where such gardens have proved other than beneficial to the employees, and also to the industries which sponsored them.

Nor have they proved successful only in years of depression. Over at Anderson, the Sefton Container Cor-

poration are old-timers in this employment garden business. Back in 1918, they inaugurated some company "war gardens." These gardens were so successful, and the results so satisfactory, that neither the company nor its employees would allow them to pass out with the signing of the Armistice. On the contrary, these industrial gardens were continued, and have been operated every year.

And, not only that. During the years, these gardens have grown considerably in both size and popularity and are now recognized by the industry as a permanent institution. Neither "war times" nor "hard times" are any longer considered a requisite to the success of these company gardens. They flourish all the time, or have for the last 13 years, and are now regarded as a highly valuable and indispensable adjunct to the regular business of the corporation, no matter what may be the trend of business conditions.

These Sefton gardens are on company land, adjacent to the main plant of the company. The soil is ideal for garden crops. Each year the company plows and puts the gardens in shape, and then the ground is surveyed into the required number of plots. The plots are numbered, and tickets with corresponding numbers are mixed in a box for the annual spring garden assignment drawing. This drawing is attended by the employees who thus receive their plot assignment by lot. From then on the gardens are in the hands of the workers. Seed and fertilizer are supplied by the company at cost.

Each year, from 65 to 85 employees, many with no other garden facilities, make the most of this excellent opportunity in growing a family vegetable supply. Much interest is taken in the work, and uniformly productive gardens are the result.

An interesting fact about these gardens is that, while they supply considerable food for the tables of the employees, these same employees are inclined to be better customers of the commercial market gardeners because they know and appreciate the value of more garden food in the home. And, by producing some few vegetables themselves, they are better able to buy additional vegetables for increas-

(*Turn to page* 55)

Part of the 39 acres of International Harvester Company's gardens at Richmond, Indiana.

Pasture Publicity

By Thomas D. Cook

County Agent, Rutland County, Vermont

RUTLAND COUNTY, Vermont, largely a dairy county standing fourth in the State in dairy cow population, has made definite progress in improving its pasture acreage. Two years' work on small pilot pasture tests scattered over the county, under a variety of soil types and with various fertilizer treatments, has given much information relative to the improvement through fertilization. Results published at the close of the 1929 season gave indications that intensive treatments not only increased the yields of pasture grass but decidedly changed the quality, and did it with a good return to the farmer.

Of the total land area in the county, 57 per cent is in farms, and of this amount 44 per cent is in pasture, being divided equally between plowable, woodland, and other pasture land. The county itself lies on the western side of the State, adjoining New York in the Champlain Valley.

The farm pastures of the county have been mined of soil fertility down through the ages, without anything being returned except the few scattered droppings. The result is that the majority of these pastures provide little more than exercise ground.

The following table gives the results on nine farms in 1929 and 1930.

Details of the Publicity Program

On the strength of the decided indications given by the small area treatment, and with the large area results being obtained by many farmers of the county, an intensive program was drawn up for January, 1931.

The campaign centered around publicity and meetings, with the ultimate goal of having a large pasture area treated with fertilizer and having a good number of farmers in the county managing their pasture land as they would any other crop.

(*Turn to page 56*)

TABLE I. PASTURE TREATMENT, INCREASES, AND COSTS

Treatment per acre	Increase in yield per acre Oven-dried 1929	Increase in yield per acre Oven-dried 1930	Cost of treatment per acre	Value of increased yield 1929-30 (protein basis)
600 lbs. superphosphate ...	600 lbs.	756 lbs.	$6.00	$20.34
600 " " 100 " muriate of potash .	1,146 "	1,579 "	$8.50	$40.88
600 " superphosphate 100 " muriate of potash 320 " nitrate of soda ..	1,963 "	1,941 "	$24.10	$58.56

All of the fertilizers were applied in 1929. In 1930 an additional 320 lbs. of nitrate of soda per acre were applied to the complete fertilizer plots.

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

"NOGAKU HAKUSHI"—which means "Learned in Agricultural Science"—was the honorary degree conferred by the Department of Education of Japan upon Dr. W. P. Brooks of the Massachusetts Agricultural College in 1919. That was a great honor, well deserved by a man who is also rightly regarded as one of the most able of the pioneers of agricultural education and research.

For twelve years Dr. Brooks rendered eminent service as an agricultural teacher, organizer, and administrator in Japan. In recognition of his successful work he was in 1888 decorated by the Government of that country, with the Fourth Order of the Rising Sun. His sojourn and investigations in the Orient gave him experience and information which later proved useful in his native land. He brought back with him certain agricultural plants which have succeeded and become highly profitable here.

Japanese millet was one of these plants, and included three species which now are known as Barnyard Millet, Japanese Foxtail Millet, and Broom Corn Millet. Of these, we understand, the Barnyard variety has proved best suited for U. S. conditions. When tested by Dr. Brooks at the Massachusetts Agricultural Experiment Station at Amherst, it produced as high as ninety bushels of seed and as much as five to six tons of hay per acre. It was the variety that for a time attracted much attention under the widely advertised trade name of "Billion Dollar Grass."

While in Japan, one of Dr. Brooks' numerous enterprises was to introduce the Ayrshire breed of dairy cattle, and without much difficulty he developed a herd at the Sapporo Agricultural College.

Dr. Brooks was, we believe, the first to introduce into, at least the Northern United States, the soybeans of Japan. One type is today known as the Brooks soybean. These beans produced as high as sixteen tons to the acre on plots at the Massachusetts Station. There, Dr. Brooks did much experimenting with the soybean in comparison with cottonseed meal as a stock food. Today, this valuable source of protein and other needed nutrients is becoming widely popular and has given good results when seeded with the corn crop or planted separately, especially on the lighter type of soils.

Native of Massachusetts

William Penn Brooks was born in South Scituate, Massachusetts, November 19, 1851, and was reared on his father's farm. After a preliminary training in the local schools, he entered Massachusetts Agricultural College, and in 1875 graduated with the Bachelor of Science degree. In 1897, he received from Friedrichs Univer-

sität, Halle, Germany, the degree of Doctor of Philosophy, *magna cum laude.*

The late President W. S. Clark of the Massachusetts Agricultural College, on the invitation of the Japanese government, went to Japan in 1876 to organize the Saporro Agricultural College, the first in that country. The following year Dr. Brooks joined the faculty of that institution, which has now grown into a University with a thousand or more students. It is called the Hohhaido Imperial University. There Dr. Brooks served as Professor of Agriculture and Director of the College Farm from 1877 to 1888. He also taught Botany from 1880 to 1888, and was Acting President from 1880 to 1883, and again from 1886 to 1887.

Dr. William Penn Brooks

Returning to America, Dr. Brooks was appointed Professor of Agriculture in the Massachusetts Agricultural College (now Massachusetts State College) and Agronomist of the Experiment Station, in which position he served from 1889 to 1918. He was also Acting President of the College from January to April, 1903, and again from January, 1905, to July, 1906. He was Director of the Massachusetts Agricultural Experiment Station from 1906 until 1918, and Consulting Agronomist, 1918-1921, when he retired. He was made Emeritus Professor of Agriculture in 1928.

Dr. Brooks has been a wonderfully active worker throughout his life, yet in addition to his multitudinous and assiduous duties as Professor and Director at the State College and Experiment Station, he found time for membership and executive work in several important scientific associations. He is a Fellow of the American Association for Advancement of Science and has served as Second Vice-President of the American Association of Agricultural Colleges and Experiment Stations and as President of the Hampden-Hampshire Agricultural Society. From 1908 to 1912, he operated a farm, and in 1908, delivered many illuminating lectures regarding soil fertility, in which subject he is recognized as an authority. In addition to his work and travels in Japan, he traveled in Europe and made himself intimately acquainted with agricultural practice and conditions there.

Writes for Farmers

Practical farmers, as well as agricultural scientists, owe enduring gratitude to Dr. Brooks for his many books and bulletins on farm subjects. He wrote them especially for the benefit of farmers, couching them in simple language and pointing out clearly how the fundamental principles of science might readily and profitably be applied to practice on the farm and in the feed lot and poultry yard.

His outstanding writings were, no doubt, three important books entitled *"Soils and How to Treat Them," "Manure and Fertilizers and Farm*

Crops," and *"Animal Husbandry."* The books were published in 1901 as a complete work on agriculture, and were revised in 1903, 1905, and 1911. They will long endure as a monument to the industry and the all-embracing knowledge of the subject possessed by their author.

Dr. Brooks was, we believe, the first American to write books particularly for the edification of farmers and stock-breeders who could not attend college. To his surprise, his publications not only became popular with the practical agriculturist, but were widely used as text-books in schools and even in colleges.

The late Dr. H. W. Collingwood, who became celebrated as editor of the *Rural New Yorker* was a great admirer of the books written by Dr. Brooks. He deplored the fact that many ultra-scientific publications about agriculture were so worded that they could not perfectly be understood by the average farmer. He therefore welcomed those which presented scientific facts and principles in such phraseology that everyone who read them might easily comprehend. These books *stimulated men to think.* That was their author's aim in writing them, and a chief purpose in his life, which was recognized and appreciated by his college associates and readers alike.

Advises Poultrymen

While Dr. Brooks is best known for his useful work relative to fertilizers and farm crops, he is also well informed in livestock and poultry. That is evidenced by his practical book on animal husbandry and by his useful Bulletin No. 122, *"Poultry Keeping for Egg Production,"* which was published under his direction by the Massachusetts Agricultural Experiment Station in 1908. That bulletin was issued as a guide to poultry keeping for egg production. The immediate responsibility for the executive work in the various experiments it summarized was carried successfully by Dr. Brooks' assistants, and he gives especial credit to Messrs. Haskell and Gaskill for help in preparing the bulletin. The experiments mentioned apparently justify the following, among other conclusions:

Regular use of condition powders for poultry means money practically thrown away as it is unnecessary for maintenance of health and will not be likely to increase egg production. Cabbage, given in moderation, is superior to cut clover rowen as a winter feed and increases the number of eggs, but, too freely fed, injures their flavor. Presence of the male bird does not affect the number of eggs produced, but increases the average weight of the egg.

While vegetable substances may contain as great a percentage of protein as animal substances, the latter are greatly superior as sources of that nutrient. Concentrated vegetable foods, such as soybean meal, linseed meal, gluten meals, etc., should not be used to replace all, or even a very large part, of animal meals, beef scraps, cut bone and meat, etc., in the ration for feeding fowls. The dry, prepared animal foods just mentioned, if of good quality, are cheaper and safer feeds than cut fresh meat and bone, and can be so used as to produce an equal egg yield. Feeding the meal in the morning, with care not to give too large a quantity, is preferable to feeding it at night. Corn, judiciously fed, may safely be largely used in rations for laying hens; but must be supplemented by a liberal proportion of animal food. So fed and supplemented, the use chiefly of corn, whole or cracked, and cornmeal rather than much wheat and wheat and corn products, lessens cost per day and per egg, somewhat increases the number of eggs, induces an earlier and better molt, and produces a higher average weight of fowls, and better market quality of birds when dressed. Buckwheat in any large proportion is a less desirable food than corn for laying

fowls. The less hard, tough fiber in feed, the better will be the egg product. Oats, barley, buckwheat, and by-products containing the husks of these grains, should be sparingly fed.

Studies Fertilizers

Dr. Brooks did much valuable work with commercial fertilizers at the Massachusetts Agricultural Experiment Station, and was instrumental in having them more generally used by the farmers of the State. His extension work in that connection was notable and was based upon the knowledge he gained from the experiments he conducted at the Station to determine what fertilizers plants need, as well as what fertilizers were required by the soil. By skillful application of fertilizers, he succeeded, among other achievements, in bringing back clover and other hay grasses to fields which had become covered with weeds and twitch grass.

The experiments conducted by Dr. Brooks at the Massachusetts Station led him, in Bulletin No. 134, to advise that when it is desired to bring into good condition land on which manure has been used for previous crops, so that it will produce a hay crop rich in clover, it will usually be best to supplement the manure by means of an application of potash. From 125 to 150 pounds of a high-grade potash salt per acre, applied in connection with manure to the previous crop, will almost invariably largely increase the proportion of clover in the hay crop when the land is seeded. If fertilizers alone are used for the preceding hoed crops, these must be rich in potash, if clover is to thrive when the land is seeded.

For thirteen years, Dr. Brooks applied potash to four experimental plots at the rate of 250 pounds per acre to two plots, and 150 pounds per acre to the other two plots. When this land was seeded, the hay crop where the larger amount of potash was used was considerably larger and contained a much greater proportion of clover than where the smaller quantity of potash was applied. In 1902, the larger application of potash gave a yield at the rate of 6,772 pounds per acre; the smaller application of potash yielded at the rate of 5,252 pounds per acre. The amount of nitrogen applied to the two sets of plots was practically the same; but the plots receiving the lighter application of potash, annually received an application of superphosphate at the rate of about 1,100 pounds per acre, against about 200 pounds per acre for the plots receiving the larger amount of potash.

Dr. Brooks' home stands as a background for the experimental plots of the Massachusetts Agricultural Experiment Station.

The fertilizer, applied where the lesser amount of potash was used, was substantially the same in its composition as average corn fertilizers, while

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An Irish Potato Record *for* South Carolina

By T. H. Seabrook

County Agent, Beaufort, South Carolina

THE old "Palmetto State" steps out as a leader in Irish potato production, and Ben Bostick, Clemson College graduate, World war Veteran, and farmer par Excellence, leads the big parade.

Two hundred and four barrels of U. S. No. 1 potatoes, eight and six-tenths barrels of U. S. No. 2's, and seven barrels of culls on one acre, during the spring season of 1931, is the record which is one of the most "talked of" accomplishments in the whole of the South Carolina truck-farming belt.

With the inauguration of a State-wide Irish Potato Contest, 10 Beaufort county farmers signified their willingness to compete for the various prizes which were offered for the largest yield of No. 1 potatoes produced on a measured acre. Mr. Bostick, always quiet and unassuming, was one of the first to enter the contest, and I knew right then and there that Beaufort county was going to give the rest of the State a run for their money. Because when this soft-spoken young man makes up his mind to do a thing, he does it right.

Let him tell you the rest of the story in his own words, and you will get a better picture of how our biggest yield of potatoes ever officially recorded was made.

Mr. Bostick Explains

"I selected my plot," says Mr. Bostick, "from a two-acre field, which had been tile-drained in the season of 1925-1926. This field had been a pond up to that time. Since drainage, the land had been limed until the physical condition of soil is almost perfect, no lime having been applied since 1929.

A view of the 600-bushel yield in the field.

"Corn with soybeans has been grown on the land for the past three years, and nothing was removed except the clean shucked corn. Each year the bean and corn stalks were turned into the land. Since I had to drain this land to plant it, I knew that it had not been robbed of any of its fertility, and I decided never to take from it more than I gave back, so that today

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Weeds follow frequent cutting of alfalfa. A plot (1) of alfalfa cut three times at succulent stages on May 15, June 7, and June 29, 1922, was followed by a heavy growth of summer weeds, mostly foxtail grasses, while an adjacent plot (2) cut but once in full bloom on June 29, 1922, grew with such vigor that no weeds appeared.

Cut More Alfalfa *by* Cutting Less

By G. E. Langdon

Wisconsin College of Agriculture

TOO frequent cutting of alfalfa may result in "bald" fields. Of course, the farmer, like the barber, may apply the best tonics, but what the alfalfa really needs is a chance to grow.

No matter how favorable the soil and climate may be for the growth of alfalfa, it has been found that early and frequent cutting will eventually cause the death of the plant.

That this is true and why it is true are disclosed by a 5-year study of the subject made at the College of Agriculture of the University of Wisconsin under the direction of Larry F. Graber, professor of agronomy. Mr. Graber has been one of the men responsible for making Wisconsin "alfalfa-conscious."

The increasing importance of alfalfa in the State, as well as in the eastern part of the United States, Mr. Graber explains, made such a study desirable. There have been a great variety of opinions about the proper time for cutting. Years ago, some believed that mowing every two weeks might be necessary with a young stand, although most of the recommendations in the past were to harvest when about one-tenth of the plants were in bloom.

The importance of this question of cutting alfalfa in its relation to the use of commercial fertilizers is an in-

teresting phase of the work. The results indicate that too frequent cutting may offset much of the gain which the plant makes because of its use of these chemical elements in growth. Since too much cutting interferes with normal plant development, a definite loss results. On the other hand, when alfalfa is cut less frequently, there is a much greater and more effective use made of the plant foods supplied.

As Mr. Graber explains: "Although the soil may be abundantly supplied with available nitrogen, phosphorus, potash, and all other requisites of growth, the plant may be deficient in organic materials for the greatest expression of its productive capacity. The productivity with relation to nitrogenous fertilization is dependent not only upon adequate supplies of moisture, phosphorus, potash, and other limiting elements within the soil, but upon the reserve foods within the plant which are also limiting factors of growth."

The reason for this beneficial effect of fewer cuttings is stated by Mr. Graber as follows: "About 90 to 95 per cent of all the dry substances in roots of plants are first made in tops. The roots not only use materials furnished by the tops to increase their spread and extent, but they are places of storage where the plant accumulates a reserve of foods for future top and root development.

"New top growths, especially in the early stages of such plants as alfalfa and other fleshy rooted plants, are developed largely at the expense of this fund of plant reserves in the roots. These reserves are stored chiefly while top growth is maturing and they are used up when the plant is young and succulent. Since the amount of these reserves limits the amount of top and root growth which can occur, it is clear that excessive cutting will kill the plant. The condition of the roots of alfalfa and the amount of top growth are so closely related that in farm practice, the subterranean parts cannot be ignored any more than the matter of quality of the hay may be disregarded.

"Alfalfa is fast becoming a valuable pasture crop for swine and in some

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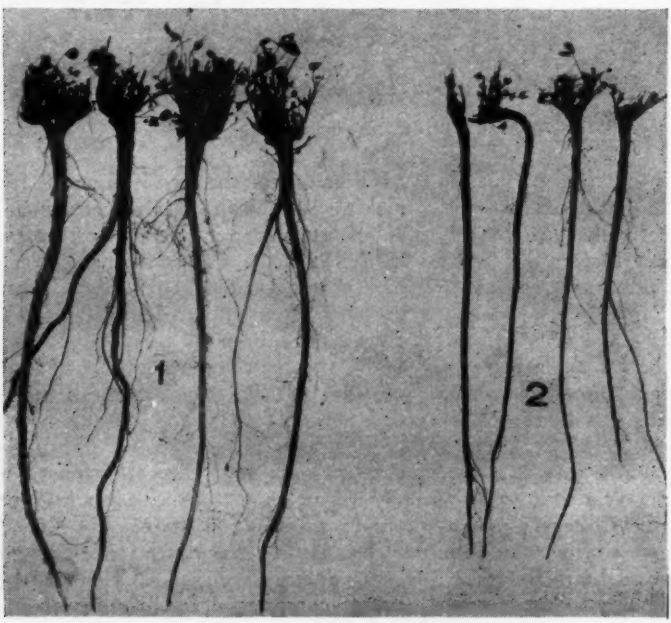

The root growth of alfalfa is affected by removals of top growth. Roots of Grimm alfalfa (two years old) from plants (1) cut twice in full bloom during 1922, are compared with roots (2) of plants cut three times, in 1922, in an early bud stage of top growth. These plants were dug December 1, 1922. Those with cuttings at mature stages (1) had an average root diameter of 6.9 mm. and an average air dry weight of 1.7 grams, compared with 5 mm. and .9 grams respectively for (2) cut three times at early bud stages of top growth.

South Carolina Competes *in* Sweets

By J. L. Baskin

Atlanta, Georgia

SOME 15 years ago the United States Department of Agriculture, in cooperation with the State experiment stations, worked out a practical method of curing sweet potatoes. Prior to the discovery of this method, which is based on partial dehydration, sweet potatoes were grown principally for home use and local markets.

Taking the hazard out of "keeping" sweet potatoes made a strong appeal to the farmers, for at the time losses after harvest were so serious that farmers were reluctant to increase their acreage.

Encouraged by the use of the curing process, many farmers planned to grow potatoes for the central markets. Extension workers and agricultural leaders assisted the farmers with plans for building curing houses in accordance with government specifications. These houses served their purpose well, keeping the potatoes until there was a satisfactory market. As soon as a considerable volume of potatoes reached the central markets, growers began to complain that prices were not sufficiently high to justify a continuation of their acreage, much less any expansion.

A survey of the markets proved conclusively that the low prices were the result of poor grading, and in many instances potatoes were being put on the market unsorted. However, the survey showed that well-graded and packed potatoes were still bringing

satisfactory prices.

Armed with the information gleaned in this survey of the markets, the United States Bureau of Markets, in cooperation with State extension workers, established standard grades for sweet potatoes. Agricultural leaders assisted growers in grading their potatoes into two grades, known as U. S. No. 1's and U. S. No. 2's. This standardization work proved of great help to the grower, and markets have accepted these grades as standard in quoting prices.

As the years went by, Southern farmers gradually lost their enthusiasm for growing this crop. There could be but one answer—there was no profit to be had growing sweet potatoes under the generally prevailing methods because of low yields.

Clemson Leads the Way

Realizing that the sweet potato industry was on the wane, in spite of the general use of the curing process and the establishment of standard grades, the South Carolina Extension Service decided to study other phases of the sweet potato industry. They found New Jersey growers making an average of 144 bushels per acre, Virginia growers making an average of 116 bushels per acre, while South Carolina growers were averaging only 81 bushels per acre.

While the Extension Service did not have any responsibility for yields beyond the borders of the State, they realized that South Carolina sweet potato growers could never make any money on this crop so long as their average production was only 81 bushels per acre. Feeling that this low average yield of 81 bushels was the chief cause of growers' lack of enthusiasm, the Extension Service decided to attack this miserably low yield that was preventing growers from making a profit.

Crop contests as a method of selling production methods were not new to the South Carolina Extension Service, and this method of elevating sweet potato yields was decided upon. A careful study of New Jersey's and Virginia's methods revealed that sweet potatoes responded wonderfully to heavy applications of fertilizer carrying from 8 to 15 per cent potash.

Every county agent was furnished rules of the contest and entry blanks. The results the first year were phenomenal and showed that yields and quality were greatly increased as the amounts of fertilizer were increased up to 1,200 pounds per acre. The largest yields of No. 1's, as well as the largest percentages of No. 1's, came from fields where fertilization was liberal and the percentage of potash high.

Realizing the splendid results obtained the first year, it was decided to continue and enlarge the contest. The second year more than 500 farmers entered, and 22 farmers produced more than 200 bushels of U. S. No. 1's, which was more than double the State's average when the contest was begun. The average net profit of all contestants reporting during the second year was $76.12 per acre.

So convincingly did the liberal application of high potash fertilizers show up in producing large yields of high quality that the College Extension Service now unqualifiedly recommends from 800 to 1,000 pounds of fertilizer carrying from 8 to 10 per cent potash.

Summary of State Contest

The 209 farmers, using an average of 909 pounds of fertilizer per acre in a State-wide sweet potato contest, reported an average net profit of $76.12 per acre. The four winners making the highest average yields made an average net profit of $231.67. These four winning contestants, making the highest average total yields, averaged 495.4 bushels per acre. They used an average of 1,237 pounds of fertilizer carrying approximately 14 per cent potash. This extra potash gave the plants the extra

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Cotton Harvesters

By H. P. Smith

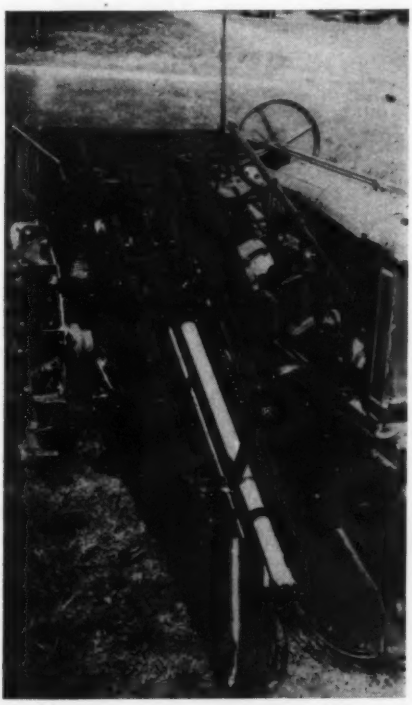
Chief, Division of Agricultural Engineering, Texas Agricultural Experiment Station

IN spite of the depression and low prices, there is more cotton being harvested mechanically in the Panhandle of Texas, this year, than at any time since 1926. In a recent trip to the vicinity of Lubbock, Texas, it was found that many different types of stripping devices, commonly called sleds were being used. These ranged all the way from the crude home-made sled having several fingers or a single slot for a stripping device to a commercial one-row horse drawn stripper and a tractor mounted and operated combined stripper, cleaner, and hull extractor.

Heretofore, the opinion has been that sledding or stripping was not practical until after a killing frost. This year, however, due to the earlier opening of the cotton, considerable stripping was done before frost had killed the leaves. This shows that there is a tendency among cotton growers to gradually move forward the date to begin stripping their cotton. If harvest is delayed until after frost, a considerable amount of cotton may have fallen on the ground.

There was a lot of cotton on the ground this year in early October, caused by its shedding and by being beat out by rain. In some fields there was as much as one-fifth of a bale to the acre on the ground. When such cotton was pulled by hand and the most of that on the ground picked up, large quantities of dirt were picked up with the cotton, making it necessary to carry around 2,400 pounds of the gathered cotton to the gin in order to get a 500-pound bale of lint. On the other hand, where the machines were being used, there was practically no attempt made by the operators to get the cotton that was on the ground, consequently, less dirt was collected by the machines than where the cotton was pulled by hand.

One farmer figured that he could use a home-made sled, leave all the cotton on the ground, and save money, because when he had paid 35 to 40 cents per hundred to get his cotton pulled and picked up, he would be pay-



Cotton stripper being developed by the Texas Agricultural Experiment Station. This is the 1931 machine at the beginning of the season.

ing for picking up about 400-500 pounds of dirt which was mixed with his pulled cotton. Then, when he figured his cost of hauling and ginning charges on his weight, it would amount to about 55 cents per hundred to pick up that cotton on the ground. He, therefore, used a two-row home-made finger type sled and harvested 14 bales of cotton off of 40 acres in four days with the help of one extra man. The two men with one team harvested around 3½ bales a day at a cost of approximately $1.75 a bale. It would have cost him on an average of $7.50 a bale to have it pulled, consequently, he figured he was saving approximately $5.75 per bale in harvesting these 14 bales of cotton, which saving practically offset what he was losing by leaving that on the ground.

One commercial concern had about 75 machines within the radius of 50 miles of Lubbock. They figured that their machine, which was sold to the farmer at $185, was capable of harvesting 400-500 acres per year and would give five years service. One farmer was using three of these one-row, horse-drawn strippers and harvesting a 400-acre field of cotton which was making around a bale to the acre. These three machines, they claimed, were harvesting 25 bales per day. When the cost of three men and three teams and depreciation was figured and prorated, they figured they were harvesting this cotton at a cost of 50 cents per bale against $7 per bale hand pulling. They also figured that to harvest an equal amount of cotton a day, it would require about 30 men pulling by hand to be able to pull as much as one machine would pull in a day.

At the present price of cotton, some farmers in the Panhandle figure that they can afford to lose the cotton on the ground and harvest their cotton mechanically. They can be independent of having to bother about hunting up a crew of hand pullers and having to be constantly after them, babying them along for fear they will leave him and go pull for neighbors. They do not pick much of the cotton in the Panhandle; they "pull" or "snap" the most of it. That is, they simply pull the burr containing the cotton, placing it all in the sack.

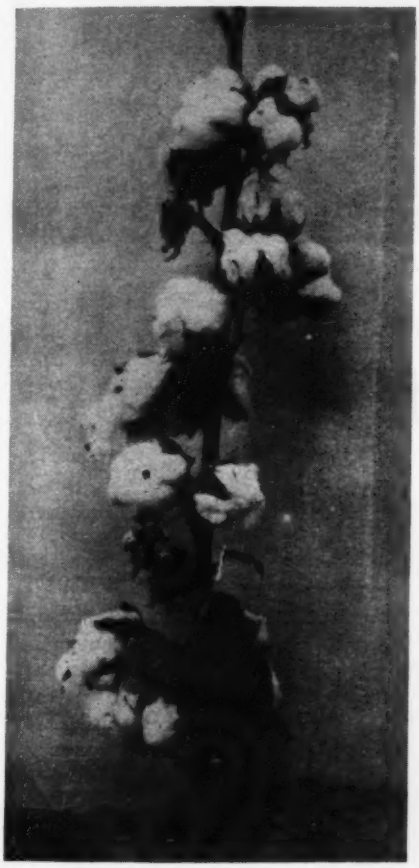
Station Sees Possibilities

When several hundred thousands of bales of cotton were harvested, mechanically, in 1926 in West Texas, the officials of the Experiment Station and A. and M. College, immediately saw the possibilities of harvesting cotton by machinery and the approach of the time when a large part of the cotton crop of the South might be harvested mechanically. They at once began studying the various types of machines being experimented with, and also began working on the development of a machine, which was hoped would ultimately prove a success as a mechanical cotton harvester. As a result of efforts put forth by various individuals, a machine has been developed with which approximately 14 bales of cotton was harvested in 1931. No special effort was made to harvest a large quantity of cotton with the machine, but it was used to harvest all of the cotton on the Agricultural Engineering Farm at College Station, consisting of approximately nine bales. After finishing the cotton at College, it was found desirable to test the machine under western Texas conditions where the practice of harvesting cotton mechanically was already under way. Consequently, the machine was carried out to Lubbock, Texas, and five bales of cotton harvested in about 12 hours, on the Texas Experiment Substation, of which Mr. D. L. Jones is superintendent.

The cultural practices, size of plant, and yield of plant at Lubbock were unlike those at College Station, and a new set of pick-up fingers had to be constructed in order to pick up some of the cotton which had fallen on the ground and to pass under and lift up

the low branches and open bolls of cotton resting on the ground. Results secured with the newly constructed fingers were quite satisfactory, since they enabled the machine to collect more of the cotton that was on the ground than was possible with the old type of fingers.

Another phase of the work being



This picture, taken October 21, 1931, is of a type of cotton plant being developed for mechanical harvesting by the Texas Agricultural Experiment Station.

carried on by the Texas Station is that of developing a variety of cotton which will be more suitable to mechanical harvesting than the average variety. As a general rule the varieties of cotton commonly grown have numerous long vegetative branches, making an excessive amount of leaves and foliage which often interfere with the easy operation of a machine. After studying the characteristics of a number of varieties as to their suitability to mechanical harvesting, it was found that a mutant strain of Durango cotton found at the Lubbock Station in 1923 had some very desirable characteristics, and this strain has been used as a parent in numerous crosses on other varieties. This was done in the hope of developing, through hybridization, a type of cotton which would have a more determinate habit of fruiting, earliness of maturity, restricted and compact branching, together with large storm-resistant bolls — characteristics which appear to be essential to the plant from the standpoint of the efficient harvesting by machinery. The fourth generation of these crosses was grown in 1931, and two, Durango X Lankart and Durango X Wacons, although lacking somewhat in uniformity, possessed practically all of the desired characteristics and gave satisfactory results in harvesting tests with the Texas Stripper.

A third problem presents itself when cotton is harvested by machinery, the removal of any extra trash collected by the machine during the harvesting process. This problem is being studied by the Texas Station and had progressed to the point where a special cleaner has been constructed. It is hoped that a type may be developed to clean mechanical harvested cotton to the extent that the grade of lint obtained will not be appreciably lower than that of hand-picked cotton.

Future Influence on Cotton

Since there are a number of experimental cotton harvesting machines being developed with varying degrees of success, the question no doubt has arisen in the minds of many individuals as to what will be the influence of a satisfactory and economical cotton harvesting machine on the South's cotton production methods. Time alone

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One of the contestants in the recently held Ontario Provincial Plowing Match.

The Art of Plowing

By E. K. Hampson

Hamilton, Ontario

MORE than 100 years ago in the Township of Scarboro on the outskirts of Toronto, then known as "Muddy York," the first plowman's association in Ontario was formed. It has functioned ever since and is still one of the most active in the Province. As the timbered lands were cleared and came under the sovereignty of the plow, many other similar associations were formed. There has always been an axiom in Ontario that a straight, well-plowed furrow is a sure sign of a diligent and careful farmer and moreover is a character index of the plowman himself.

Twenty years ago a Provincial Plowman's Association was formed for the purpose of uniting the 190 local branches throughout the Province. This association has been presided over by J. Lockie Wilson, a figure known throughout the length and breadth of Ontario as a man of character and vision, preaching incessantly the gospel of a better agriculture.

Since that time the Association has grown spectacularly. It is now the largest of its kind in the world. At Stratford last year, 100,000 people attended the Provincial Match; and 288 teams were required for the contestants. Tractor classes had 113 entrants. Multiple horse hitches were demonstrated daily; while industrial firms displayed all that was new in farm machinery and equipment. Colleges and Experimental Stations disseminated new information in cultural methods, in fertilizer practice, and in the marketing of farm produce.

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Indiana Grows Sweet Potatoes

By W. B. Ward

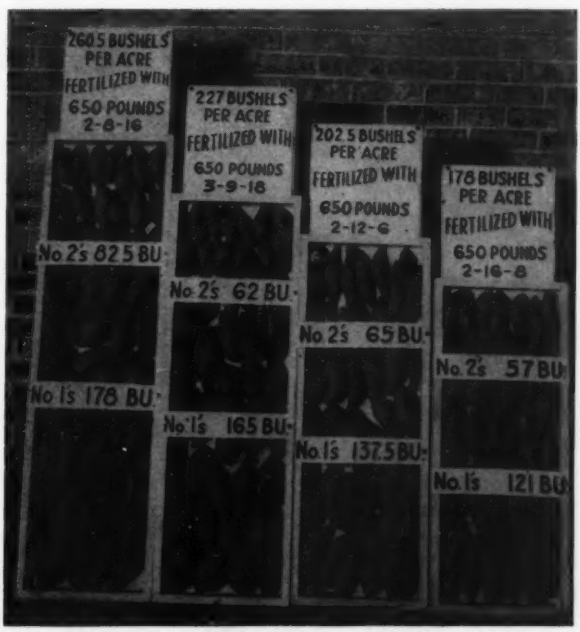
Horticultural Extension, Purdue University

YOU can farm the way your forefathers did or gamble upon the stock market with equal results, but raising 651 bushels of prime sweet potatoes per acre is a different thing. Henry Quillen, Patoka, Indiana, grew 551 bushels of extra fine quality No. 1's and 100 bushels of No. 2's per acre and topped the growers enrolled in the Gold Medal Sweet Potato Club of Indiana for the 1931 season.

High yields give high quality and quality is what brings in the greatest returns per acre. During the 1930 season, the first year of the club, Mr. Quillen found that extra amounts of fertilizer paid on his demonstration plot, and his yield of 348 bushels of No. 1's ranked second.

Early in the spring of 1931, the whole field of 13 acres was covered with manure at the rate of eight loads per acre, and this was plowed under. The latter part of April, 175 pounds of an 0-8-32, a pre-planting application, was applied to each row and the ridge built over the fertilizer.

Small Stem Yellow Jersey was the variety used and bedded early enough to have good healthy slips ready to plant by the latter part of May. Fifty-two bushels of seed were used, and Mr. Quillen bedded four bushels of his own seed for each acre. The rows were 34 inches apart, and on May 25 the plants were set 14 inches apart in the row. A week later he side-dressed the sweet potato plants with 750 pounds of a 3-9-18, putting the fertilizer down where the plants could use it, and immediately followed with the first cultivation. Cultivation was continued as long as there was no evidence of injury to the vine growth,


260.5 BUSHELS PER ACRE FERTILIZED WITH 650 POUNDS 2-8-16
No 2's 62.5 BU
No 1's 178 BU
227 BUSHELS PER ACRE FERTILIZED WITH 650 POUNDS 3-9-18
No 2's 62 BU
No 1's 165 BU
202.5 BUSHELS PER ACRE FERTILIZED WITH 650 POUNDS 2-12-6
No 2's 65 BU
No 1's 137.5 BU
178 BUSHELS PER ACRE FERTILIZED WITH 650 POUNDS 2-16-8
No 2's 57 BU
No 1's 121 BU

Comparative results of various analyses show larger yields and more chunks from high potash fertilizers.

TABLE I.—1-2 RATIO OF PHOSPHORIC ACID TO POTASH PROVES MORE PROFITABLE THAN 2-1 RATIO

Cooperator 1931	Fertilizer Treatment	Yields per Acre		
		No. 1's	No. 2's	Total
M. L. Lowe	500 lbs. 2-8-16	179.5 bus.	89.5 bus.	269.0 bus.
Owensville, Ind.	500 lbs. 3-9-18	160.0 "	61.0 "	221.0 "
	500 lbs. 2-12-6	123.5 "	64.0 "	187.5 "
	500 lbs. 2-16-8	90.0 "	57.0 "	147.0 "
C. E. Garret...	800 lbs. 2-8-16	176.7 "	75.8 "	252.5 "
Patoka, Ind.	800 lbs. 3-9-18	170.5 "	63.1 "	233.6 "
	800 lbs. 2-12-6	151.5 "	66.3 "	217.8 "
	800 lbs. 2-16-8	151.5 "	56.8 "	208.3 "
Charles Stevens..	625 lbs. 3-9-18	248.5 "	87.5 "	336.0 "
Oaktown, Ind. .	625 lbs. 2-16-8	191.0 "	94.0 "	285.0 "
	No fertilizer	90.0 "	60.0 "	150.0 "

and all weeds and grass were kept out.

With less than normal rainfall throughout the season, the crop was harvested on October 23 with very gratifying results, inasmuch as the sweets were quite chunky and of good type. Other growers, neighbors of Mr. Quillen, as well as growers in the adjoining county, also had excellent results, and it was found that high potash fertilizers produced more chunky sweets.

By studying Table I, in the Lowe and Garrett fields, by reversing the ratio of phosphoric acid to potash from a 2-1 as found in the 2-12-6 and the 2-16-8 analyses, to a 1-2 ratio as in a 2-8-16 or 3-9-18, the increase in average yield was 54 bushels or over 28 per cent in the two plots.

The Charles Stevens plot with 1-2 ratio, or 3-9-18, gave a better yield than the 2-1 ratio, or 2-16-8, by 51 bushels. The 3-9-18 fertilizer more than doubled the yield over the non-fertilized check with a 186 bushel increase.

These data, as well as experience from other growers, show that fertilizers carrying phosphoric acid and potash in a 1-2 ratio are the most desirable analyses for this territory.

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Fertilizer	Yield	% No. 1's
Left —1,000 lbs. 2-12-6	348 bus.	86%
Right— 750 lbs. 3-9-18	354 bus.	95%

Fertilizer demonstrated its value on corn, when two rows across the field were left unfertilized.

St. Croix County Demonstration Farms

By I. J. Mathews

Winamac, Indiana

AFTER an absence of 10 years, Joe Murphy with sharp analytical eyes surveyed the old Murphy farm and surrounding community, near Hammond, Wisconsin, some 30 miles from St. Paul. Away to the west, across gently rolling acres of deep black loam soil, the ancient St. Croix river meandered aimlessly back and forth across the broad alluvial plain it has been building for centuries.

But since Joe Murphy had been on the old place last, the tenacle-like roots of continuous grain crops had sapped these acres of their ready fertility. Murphy's thick chin protruded as he kicked into the stubborn sod, matted with quackgrass roots.

The big cavernous barn behind him, built in a day when lumber was on every stump, had been gaping for many a year. And inquiry among the neighbors brought the admission that their soil too, had lost its strength and their barns had never been full except for the first few years after they were built.

Joe Murphy was making a frank appraisal. Would it be profitable or possible for him to rout the quack, restore the soil to its pristine productiveness, fill the empty barns, and live in the

country?

Could he repossess the old farm and other adjacent acres and on these put into operation principles that would justify the name he would choose for the land—"St. Croix County Demonstration Farms"?

"This is the way it came about," one of the neighbors told Murphy, reciting a bit of history. "At first, we grew clover; every seed came. Later, clover seedings made scant stands; later still, the clover failed in all except the most favored locations—gravel knolls, strips along the road, and parts of fields tucked in behind woods. When clover failed, then grain followed grain, then more grain and so on, always sparser clover and poorer grain. Finally, no clover, little shriveled grain, barns full of . . . local atmosphere!"

From an old lumberman, Murphy pieced out the story of the monopoly of the soil by quackgrass. "When the lumbermen, Paul Bunyan and others, were logging this country off, they bought the cheapest hay they could find for the company teams. Much of this was quackgrass hay, and the teamsters carrying it on the bunks of their sleighs scattered the seed all over the woods. Just as soon as the soil was cleared, the quack was ready."

Murphy Decides

Into this troublesome triangle common to northern United States—no clover and poor grain crops, empty barns, and quack-ridden soil—Joe Murphy, with dogged resolution written into his features, unfurled the standard of proven practices worked out by himself and the College of Agriculture of the University of Wisconsin. From that time on, the story gains interest because of the results which have been obtained.

At present, there are 1,400 acres in the farm, with 400 more under lease with an option to buy. And this year, where but a few years back the quackgrass held undisputed dominion over hundreds of acres, Murphy grew 540 acres of barley, 600 acres of alfalfa and sweet clover, both new and old seeding, and 540 acres of corn. There are 200 acres in permanent pasture.

"The first thing we did was to control the quackgrass," Murphy stated in reviewing the results. "We have tried two methods."

"At first, we plowed the quack sod, later keeping down every green shoot, hoping to wear down the vitality of the roots. This is effective, but requires a large investment to work the field one year before getting any return.

"Lately we have been putting the quackgrass field to corn the first year and hoeing around the hills. And again the second year, corn is planted in the field and kept clean. After the corn for the silo is removed, the soil is thoroughly worked down to keep the quackgrass from getting a new lease again that fall, and the following spring, alfalfa or sweet clover is seeded with the barley."

Believes in Quality

Murphy's reasoning on the quality of crops to raise is sound. "It takes as much plant food to make a bushel of good barley as a bushel of poor stuff," he told me. "And the same applies to corn. A farmer is trafficking in plant food, you can't dodge that, so his best game is to put his plant food into the most efficient grains the plant breeder has perfected."

And this owner acted on the strength of his convictions, for he secured certified seed of smooth-awn Wisconsin No. 38 barley, a strain developed by plant breeders at the University of Wisconsin.

On a field that grew sweet clover in 1929, Murphy harvested 52 bushels of barley per acre in 1930. In 1931, his entire 540 acres of barley averaged 37 bushels per acre, in spite of the fact that upper Wisconsin was afflicted with a severe late spring drought that put a crimp in spring-sown grains generally. The average yield of common barley in the neighborhood was 17 bushels.

I saw some of this year's crop, and cleaner, heavier barley never rolled out of a separator spout. Smooth, long grains with cream colored husks and clear amber kernels! They laid so close together they felt like lead in the hand; the test weight at threshing time was 46 pounds per bushel.

But let us go back a bit. In the spring of 1930, Murphy spread 92 carloads of lime on 1,400 acres of soil. And having the quackgrass under control and lime in the soil, Murphy put sweet clover or alfalfa seed in with all his small grains, which were mainly barley.

Believes in Fertilizers

This operator lays much stress upon commercial fertilizer, because experience has taught him that he can't afford to do without it.

When the seed barley is being dumped into the drill in the spring, Murphy looks ahead to the alfalfa and sweet clover which will piece out the summer, after the barley is harvested, and will continue the following year. And that forward look to the plant food needs of both the barley and legume crop influences him to set the drill to apply 250 pounds of a 3-12-12 fertilizer per acre.

"Nitrogen for the spring," he explained, "phosphoric acid for the barley, and potash for the alfalfa and sweet clover."

After the first cutting of alfalfa hay, he set the fertilizer distributor at 125 pounds per acre and put an 0-20-20 analysis into the hopper. "Keeps the pep in 'er," he observed.

"No sir. No crop goes in without fertilizer on this farm," he said. "If we sow alfalfa alone, we use 250 pounds of 0-20-20. For corn, our practice is to apply 125 pounds per acre of 4-20-10 with the corn."

This owner does not underestimate the tenacity of quackgrass. "It will come in and occupy the ground when it gets so poor nothing else can grow," he admitted "but after you've done a thorough job of quackgrass eradication, if you put fertility in the soil, the alfalfa can stand off the quack." For proof he pointed out a strip of quackgrass in a big field of alfalfa north of the buildings.

"When we sowed barley there," he stated, "we used 200 pounds of 0-20-20 with it. On four drill widths across the field, the fertilizer attachment was shut off."

It did not take a telescope to find this strip. On the unfertilized area, the few struggling roots of quackgrass that had escaped the tillage implements had multiplied into a 100 per cent sod. On the other side of the line, the alfalfa was thick and green and rank. There could be no mistaking the cause. The plant food in the soil, equal parts phosphoric acid and potash, had enabled the alfalfa to more than hold its own against the voracious intruder.

Now when Joe Murphy looks out from the same spot from which he once surveyed the dissipated soil and hungry barns, he has as a background a beautiful country home, the old home repainted and

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Fertilizing Trees

By T. H. Blow

Springfield, Massachusetts

THAT fertilizer applications made to forestry seedbeds materially affect the size and growth of seedlings is shown at the end of two years of plot work at the St. Lawrence University, Canton, New York.

In the spring of 1930, under the direction of F. M. Callward, Professor of Forestry at this institution, series of fertilized plots were laid out on white pine, Norway spruce, red pine, white spruce, Scotch pine, with plots receiving no fertilizer for checks. Basic treatments on all plots were 500 pounds of a 4-4-4 fertilizer. The three elements, nitrogen, phosphorus, and potash, were increased in three series each by 6, 8, and 10 per cent respectively. The soil tested neutral, and seed was sown early in the spring after the fertilizers had been thoroughly mixed into the soil. Germination was poor except on the Norway spruce, Scotch pine, and check plots, but enough young plants survived to allow measurements at the end of two years. The duplicate plots started in the spring of 1931 show a much more even stand due to excellent seed germination of all varieties.

A study of the root systems on the two-year stock showed that the extra nitrogen produced a more slender tap root, going well into the soil; the plots having extra phosphorus tended to be more branching with a good supply of small feeder roots; while the extra potash combined both the long tap root and many branching feeders to make the best of the three root systems. This combination is very desirable for the best tree development. The seedlings on this high-potash plot

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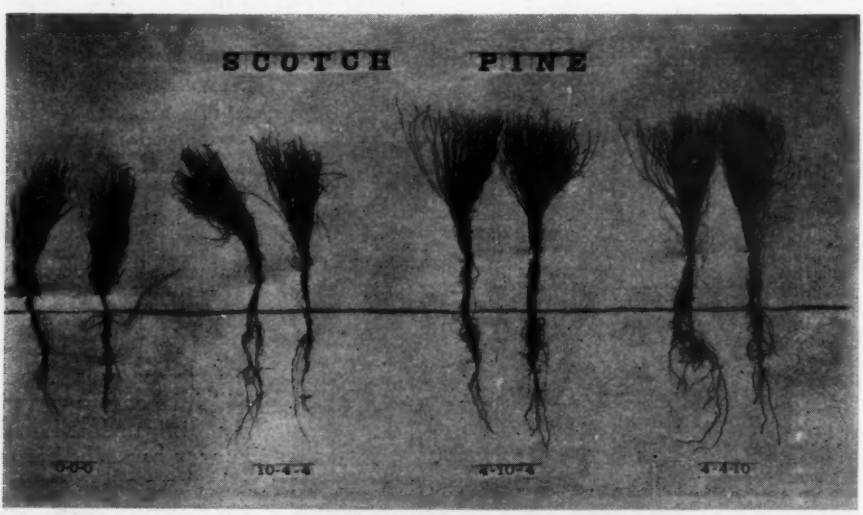


Showing the effect of fertilizer treatments on two-year Scotch pine seedlings. The black line indicates ground line.

THE SEASON'S GREETINGS

PICTORIAL

Left: "Milk, vegetables, and fruit," say these 1931 health champions. Registering the highest score ever recorded in a national health contest, Gertrude Heikes, 16, of Dakota county, Nebraska, scored 99.9. William Sanders, 18, of Johnson county, Indiana, scored 99.1. Miss Heikes weighs 137 pounds and is 5′ 4″ tall. Sanders weighs 156 pounds and is 5′ 9″ tall.

Below: These typical American farm boys were selected as trophy winners in the annual National 4-H Club Leadership Contest at the National Congress recently held in Chicago. They are: left, Charles L. Brown of Battle Ground, Indiana, and right, Roscoe E. Owens of Guilford, New York.

Above: There is neither room at the table nor conversation for old man "Hard Times" when the children and grandchildren come home for the holidays. This scene, typical of others in countless American farm homes, was taken in the home of Mr. and Mrs. F. M. Peavey of Clay City, Indiana.

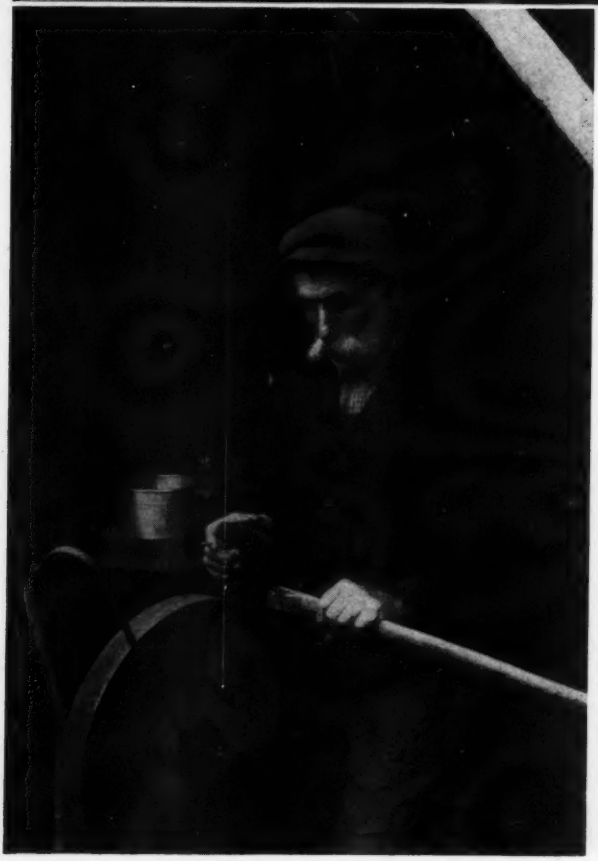
Right: And "When the Day Is Over," there is no better expression for the happiness and content of the family circle than an hour of the old songs in which all can join. It is occasions like these that hold memories to the charm of farm life.

Above: The whole family helps in packing the choice strawberries near Avignon, in southern France.

Below: An old water wheel in Provencal, France.

Above: A load of fruit and vegetables ready to be taken to the market in Avignon, near Marseilles.

Below: Spreading sulphate of potash for tomatoes in southern France.



Above: Herman Pankop, Indiana winner in the Five-acre Corn Club and possibly world champion with his yield of 156.2 bushels per acre, and his father, Earl Pankop, who won the crown last year with a yield of 129 bushels per acre and placed second this year with a yield of 144.5 bushels per acre. Both men farm in DeKalb county, near Corunna, Indiana. Herman had his corn in a loam and muck soil that was in pasture in 1928, onions in 1929, corn in 1930, and corn again this year. During the past two years he placed 100 tons of manure on the plot and in addition he put 150 lbs. of 2-14-7 commercial fertilizer in the row and broadcast 250 lbs. of 0-12-18 per acre. His father applied 100 tons of manure, 200 lbs. of 2-14-7 drilled in the row, and 200 lbs. of 0-12-18 broadcast.

Left: Providing a valuable asset to farm savings, farm woodlots will receive even more attention this year. Here is a farmer preparing to take advantage of the hours between chores.

The Editors Talk

Want Amidst Plenty

The world is in want. Yet the world has, or could have plenty. Why then does the world want and millions suffer for lack of the simple necessities of life? To what end is human thought and activity tending if with all the vaunted help of a scientific age, far-reaching powers of organization, and the experience of the ages behind us, amidst granaries that are over-flowing, humanity cannot yet be assured of a daily loaf of bread?

Of all the problems challenging human thought and character, this problem of want amidst plenty is the saddest and most acute. The more so to the average man unlearned in the higher intricacies of world finance, because to his relatively direct way of looking at things around him, human suffering amidst present facilities for production, both urban and agricultural, seems unnecessary. The growing complications of world trade and finance make this problem difficult to understand.

Complexity is the price demanded for modern civilization. The ancient simple exchange of goods by barter has become more involved by the introduction of other factors, especially by price, the medium through which goods are exchanged and which in turn is related to the gold supply. Methods of financing, credit, the free or restricted flow of goods from one country to another, and other influences also affect the exchange of goods and volumes of trade. Thus, our present civilization is sustained, not by a simple exchange of goods, but by a world system of exchange. When the system works well in all its parts, the product is prosperity; and when it gets out of order, the result is depression.

What explanation do the economists give for the system getting out of order? For of all the people qualified to give an opinion, certainly the economists might be expected to explain and interpret such causes.

There are, of course, schools of economic thought as there are schools of all thought, with resulting differences in emphasis and interpretations. But an explanation of one cause for present conditions which has the virtue of being very clearly presented in every-day language, is one by G. F. Warren and F. A. Pearson in an article "Prices and Gold" recently published in the *Farm Journal.*

This cause is the relation of gold to prices. First, in recent years there has been a greater demand for gold. In order to return to the gold standards following the war, many countries have required more gold. Nations have also required more gold than in prewar days because the world now conducts a larger volume of business. A certain quantity of gold will support a given volume of industrial production. But, as Warren and Pearson point out, "on the prewar basis of gold to prices, the present world gold supply would support a price level of about 83, when prewar is considered as 100. Our price level in 1929 was 141. It is not surprising that prices have fallen." Yet the world's gold supply has not increased in proportion in recent years; in fact, it has declined.

Thus, because a relatively limited supply of gold is in steady demand, people are willing to exchange larger and larger amounts of goods and services for a

given quantity of the gold available. This means that as the demand for gold increases, prices have declined. Rapidly declining prices mean deflation and depression. As the authors point out, the law of supply and demand is only half the problem, "the general level of prices is determined by the supply of and demand for money."

But while explanations in broad outline may be comparatively simple, the problem in its closer contacts and necessary adjustments is, of course, extremely difficult and complicated. Certainly it helps to clarify the situation in the mind of the average man when such well-known economists as Warren and Pearson interpret causes in simple every-day language, and both they and the *Farm Journal* are to be congratulated for this service. For the more the essential facts are presented to the public in terms they can understand, the more the public will become educated to the fundamentals of the economic viewpoint and consequently, the less the danger of ill-digested panaceas being advocated and adopted. In fact, one of the most striking phenomena of the present time is the circulation of a more accurate knowledge of the present situation in all its aspects, which is the chief cause possibly for the absence of panics and labor difficulties and on the more positive side, for the organization of voluntary work for the social good.

If the broad interpretation of economists is to be accepted, there is no panacea or short cut. Ultimate recovery is a long road demanding patience and hard work. The best that we, as average citizens, can do possibly is to helpfully adjust our ways of living to our surroundings as best we can. But more than this, we should use all the influence we may have to encourage and support the teachings and plans of honest men who are in a position to know the intricacies of the present situation, both from a world and national viewpoint. By so doing, we will support them in taking whatever measures are necessary so that the machinery of trade may again function to the ultimate end that amidst plenty every man may be assured, both of a day's work and a proper return for his labor.

Catering to the Public

Agriculture and industry alike must find some method of producing profits other than through mass production alone. With an almost unlimited expansion of the American and foreign markets, industry and agriculture have busied themselves with but one goal, that of increasing production and thereby lowering cost. In order to accomplish this mass production and secure cheap unit cost, standardization has been the order of the day. But the consuming public is made up of individuals whose ideas differ and, therefore, they want merchandise and products of a wide variety—variety of shape, pattern, color, and taste.

Both farm and factory have found standardization and mass production profitable so long as the supply was less than the demand. However, under this highly mechanized and highly standardized program, production now greatly exceeds demand in almost every line. When the markets become glutted or over-supplied, the consuming public finds it a wonderful opportunity to exercise extreme caution and discrimination.

Thoughtful manufacturers of textiles or other products no longer manufacture large quantities of given style, model, or pattern without first securing orders for at least a part of their output. It seems that the day of blind mass production of standardized products is about at an end. Producers can no longer dictate what the consumer will eat, wear, or use. The consumer who

pays the price has a right to some consideration, and already some of our most progressive manufacturers and producers of farm products have turned their plants to the production of articles of quality and individuality.

Of course, such changes require additional capital, but why continue producing that which the public does not want? The most prosperous groups of the textile industry are the manufacturers of rayon. Many of these plants formerly produced cotton fabrics, but staked their future on the increasing popularity of rayon.

Many farmers who produced staple products such as cotton, corn, and wheat are now growing small quantities of other products for which there is a limited, but a ready, market. Certainly there is a limited demand for the products of highly specialized farms and factories, but the profits usually go to those who first venture into a field and become recognized and established. It is true that the production of specialties and novelties either in the field of industry or agriculture is hazardous and limited, but how can it be more hazardous than continuing to produce that which the public does not want, or rather is unwilling to buy at a fair price.

Land Utilization Conference

A land utilization conference, under the joint auspices of Secretary of Agriculture Arthur M. Hyde and the Association of Land Grant Colleges and Universities, recently met in Chicago. More than 350 registered delegates voted on definite recommendations for the better utilization of agricultural lands. As the Secretary of Agriculture pointed out, the need for land utilization "lies in the vast waste of human and material resources now taking place in our rural areas."

Eighteen recommendations were made. They covered a variety of subjects. It was recommended by the conference that the grazing ranges on public land should be organized under a federal agency similar to the organization of the national forests; that lands valuable for watershed protection, even though in different States, should be administered under the supervision of the federal government; that school lands in the Western States should be consolidated; that agricultural credit should be jointly studied by representatives of all organizations dealing with credit; that the agricultural outlook work should be enlarged and organized on a national and local basis; and that an economic inventory of the land resources on the basis of the agricultural value of land be made.

Other recommendations dealt with homestead interest, taxation, the licensing of land development enterprises, the use of marginal land; that the reclamation service confine its efforts to finishing projects already started; that factors affecting regional competition be studied; that steps should be taken to initiate a soil conservation program; that soil survey work and land utilization surveys, particularly in newer territories, should be coordinated.

Of vital interest in our growing industrial age is the recommendation of decentralizing industry and its effect upon land utilization. Finally, regional conferences were recommended, also the creation of two national committees to be known as the National Land Use Planning Committee and the other to be known as the National Advisory and Legislative Committee on Land Use.

The proper use of land on the most efficient basis for the greater social good is certainly a problem that offers wide scope to all the imagination and executive ability that can be given to it.

Farm Income 1931

The income of the American farmer for 1931 is estimated by Secretary Hyde in his annual report at $7,000,000,000, which is in sharp contrast to an income of $9,347,000,000 for 1930 and $11,911,000,000 for 1929, and represents a decline of approximately $5,000,000,000 in two years.

Even though farmers obtained "some small compensation for price declines in the shape of reduced production costs," the American farmer still faces a grave problem requiring all the adjustments possible, both on the part of Government and by his own individual efforts.

Necessary adjustments include that of wheat acreage, for the report points out that "wheat production, though less this year than it was in 1930, is not sufficiently less to make a large cut in the carry-over." The overproduction of wheat, the report says, is a cumulative and not merely a seasonal condition. In general American agriculture is over-expanded in production for export, and lessened dependence on the export trade is recommended.

The influence of the world depression on the fortunes of agriculture is emphasized by Secretary Hyde. But emphasis is laid on the primary importance of adjusting production within the United States. That the decline in the general level of farm prices which has been practically continuous for more than two years was checked during the period from October 15 to November 15 is encouraging. The index at 71 on November 15 represented a three point rise over the preceding month, which is the most pronounced upward movement the index has shown since August, 1929. It may be that the farm prices, low as they are, are tending to stabilize, which in the case of many of the major crops would be a great help towards increasing consumption.

It is also possible that the prices of commodities which the farmer purchases may continue to decline, so that together with possible stabilization of farm prices, the farmer may not be so badly off next year as the sharp decline in farm income would indicate.

Christmas 1931

Hard times this Christmas season will compel many of us to examine with care, and possibly with some misgiving, our personal scale of values. In other words, what do we need to make us happy? What do we believe is necessary for joy and happiness at Christmas time?

If happiness requires cars, radios, parties, and the exchange of expensive and striking presents, then are most of us doomed to disappointment and to anything but happiness, for we know only too well that the Christmas spirit this season must bear fruit within the narrow limits of small and careful expenditures.

But why need this be any bar to a happy Christmas, for hard times are a challenge to the spirit; to finding happiness in simple family and neighborhood privileges and pleasures, and in the giving of simple things that may cost but little. And if hard times has in any way turned our minds from the emphasis on expense and display to simple privileges and pleasures, and if any joy has been found in the doing of them, then a Christmas in hard times may yet be the greatest thing that has happened in our generation.

A Happy Christmas to all our readers and contributors and may the New Year carry you along the road to real happiness.

Indiana Grows Sweet Potatoes

(*From page* 26)

Table II shows that during this past season the early application of muriate of potash was a very important factor in the production of chunky sweets.

TABLE II.—EXTRA EARLY APPLICATIONS OF MURIATE OF POTASH INCREASED TOTAL YIELDS AND BUSHELS OF NO. 1's.

Cooperator	Pre-season Application of Muriate of Potash	Fertilizer Treatment at Planting	Yields per Acre (Bushels)		
			No. 1's	No. 2's	Total
*Mervin Holcomb	250 lbs. 0-0-50	375 lbs. 4-16-8	253	44	297
Oaktown, Ind.	Jan. 17	375 lbs. 4-16-8	193	65	258
George Shaw	300 lbs. 0-0-50	600 lbs. 4-4-20	128.5	80.5	209
Oaktown, Ind.	Jan. 20	600 lbs. 4-4-20	64.5	36.0	100.5
Edward Neal	500 lbs. 0-0-50	500 lbs. 2-12-6	284	72	356
Decker, Ind.	Jan. 26	500 lbs. 2-12-6	231	63	294
Irvin Jarding	500 lbs. 0-0-50	550 lbs. 0-12-6	262	67	329
Vincennes, Ind.	Jan. 26	550 lbs. 0-12-6	190	58	248

* The sweet potatoes exhibited by Mervin Holcomb were awarded first prize at the International Hay and Grain Show, Chicago, 1931. Indiana also won sweepstakes of the show over all other States.

Cotton Harvesters

(*From page* 23)

will answer this question, but many like to try forecasting and prophesy as to what might be the result. The following are some of the probable changes that may be brought about:

1—The first question that is usually asked regarding the influence of harvesting cotton by machinery is: What are we going to do with labor that machine harvesting will be expected to displace? One answer for this is that the transition from hand harvesting to mechanical harvesting likely will be so gradual that the displaced labor will be able to

This two-row finger type cotton sled is home-made.

adjust itself without any hardships. Then, as time goes on, various methods of financing the production of the crop and different agreements between the landlord and tenant will be worked out.

2—The change from hand harvesting to machine harvesting is now starting in the Panhandles of Texas and Oklahoma and will gradually spread into other sections.

3—The spreading from one section to another will very likely be the result of adapting different types of machines for different sections. For example, stripping might be the method used in the northwest, while probably a picking machine will be the type of machine for other sections.

4—It is already a recognized fact in the Panhandle that those who do harvest their cotton mechanically with the least loss must plant, cultivate, and shape the ground during the last cultivation so that it will be easier for the machines to collect any cotton that might be on the ground.

5—Another important point that must be considered is the selection of a variety of cotton suitable to mechanical harvesting. This may mean the adaptation of new varieties bred especially to suit machine harvesting.

6—Harvesting by machinery will practically make the cotton grower independent of outside help and make cotton production more a family affair, provided, of course, he changes his cultural practices to eliminate chopping and excessive hoeing.

St. Croix Demonstration Farms

(*From page* 29)

repaired, sheltered by large elms, maples and clusters of evergreens. And instead of bristling quackgrass sods, sparse fields of wheat or struggling corn, Murphy sees thick, golden heads of barley, rolling slopes of blue-green alfalfa, and corn, vigorous from its supply of plant food in the soil.

In the fall, his own barns full of hay, he rents two-thirds of the barn space in six of his neighbors' barns, and besides this, 50-ton hay stacks are scattered about over his own hay fields.

With a satisfied smile he said, "Lime, good seed, and proper fertilizers did it." But to these we take the liberty of adding a fourth factor, "a resolute chin."

Fertilizing Trees

(*From page* 30)

were more stocky, sturdier, and had a greater top growth than those on either the nitrogen or phosphorus series.

Average measurements made on the two-year Scotch pine for the high treatment of each series were:

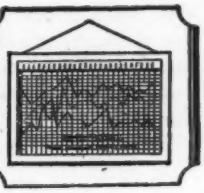
	Check	10-4-4	4-10-4	4-4-10
	inches	inches	inches	inches
Top growth	5.1	5.5	5.9	6.3
Root growth	6.0	7.5	7.0	8.0

With Norway spruce the 8-4-4, 4-8-4, and 4-4-8 plots showed to the best advantage. In this particular series a slight yellowing effect was noticeable with the higher phosphorus treatments.

On the plots started in 1931, locust and ash were added to the list of varieties. First year growth was very rapid,

(*Turn to page* 44)

AGRICULTURAL DEVELOPMENTS



NEW POTATO HARVESTER

To take the backache out of potato harvesting, agricultural engineers of the Pennsylvania State College are developing a new machine. The second model of the implement recently completed a trial on a 12-acre field of potatoes on the college farm.

The new machine is attached behind an ordinary digger. As the potatoes are dug they drop on a slowly moving conveyor table on the harvester. Here the vines are removed by hand and the potatoes are placed by several men on belts which carry them to a wagon elevator or to a crating device. The picking table is about waist high, so that the men can work comfortably.

Two bushels a minute have been handled by the men and the machine. Turns and delays retard the operation so that 75 bushels an hour is the best speed made for an entire day.

VITAMINS IN COTTONSEED FLOUR

Cottonseed flour has proved to be a valuable source of vitamins B and G, both needed in diets restricted because of last year's drought or reduced incomes. The Bureau of Home Economics, United States Department of Agriculture, has carried on a number of special vitamin studies during the last year, to supplement its recommendations for low-cost diets and pellagra-preventive foods that are cheap and readily available in the areas where they are most needed.

Cottonseed flour, which is valuable in many ways as a human food, has been on the market for more than 10 years. It is more finely ground and more highly refined than the meal from which it is made. Laboratory tests show that it is a fair source of vitamin B and that it contains from one-half to one-third as much vitamin G as yeast. At its present price of less than 10 cents a pound, cottonseed flour is a relatively cheap source of these vitamins and also contains other nutrients.

Very palatable baked products can be made by using part cottonseed flour, the bureau finds. Bread, muffins, and doughnuts are especially good. As cottonseed flour does not contain the gluten-forming constituents that give bread-making value to wheat flour, it is generally used in combinations with bolted wheat flour. Cottonseed flour was substituted for about one-fifth of the wheat flour in the baked goods made by the bureau. Bread made from this combination has a dark color and a nutty flavor. When used in the proportion suggested, cottonseed flour affords ample amounts of the pellagra-preventive factor for most diets.

FARMERS MUST PLACE PRODUCTION BEFORE MARKETING

"I still think that we Pennsylvania potato growers must concern ourselves chiefly with the problems of production in spite of the fact that a great many growers resent discussing such problems at our meetings and instead advocate mainly discussions on marketing," writes a prominent grower and Master Farmer. He continues, "We must market what people want. We cannot grade and market what we

have not produced. This year and last year I had to sell all of my potatoes at home, for I had nothing to grade and ship to the large wholesale market because of appearance."

Exactly so! The crux of marketing farm products in Pennsylvania is having products of quality to sell. Good stuff, be it potatoes, apples, dairy cattle, or what not, has a ready market. It is the producer of poor stuff who puts it up in unattractive form that has a severe marketing problem. And that problem grows out of a keen competition coming from the shipment of good products into our state from other areas.—*Miles Horst—Pennsylvania Farmer.*

Fertilized Trees

(*From page* 42)

and measurements of the top growth on October 22 showed a difference of 10.6 inches for the locust and 4.7 inches for the ash in favor of the completely fertilized plot. These measurements are the average of the various treatments, due to a change in the plot layout.

In forest nursery practice these results to date would indicate that fertilizers could be used to advantage in producing more sturdiness in both root and top growth of seedlings. High potash with reasonably high phosphorus would seem very essential for best results. However, with further work being carried on with a duplicate set of plots more definite recommendations must be left to a later date.

South Carolina Competes in Sweets

(*From page* 20)

power to make more No. 1's and win the prizes. Of their total yields 70 per cent were No. 1's, while the average for all contestants was only 57 per cent No. 1's.

Potash increases total yield as well as the percentage of No. 1's, thereby adding profit in two ways. The Virginia Truck Experiment Station after nine years testing recommends 1,000 pounds of complete fertilizer carrying 15 per cent potash.

Here is what T. L. Gramling of Orangeburg county, the State champion contest winner who made 579 bushels per acre, says about fertilizing this crop, as reported in South Carolina Extension Circular No. 111: "Use a liberal amount of a well-balanced potato fertilizer analyzing about 8 per cent phosphoric acid, 3 or 4 per cent ammonia, and 15 to 20 per cent potash."

South Carolina did what other States failed to do, she brought all the loose ends of the sweet potato industry together, i.e., production, grading, and marketing. Certainly she has not reached perfection in any of these fields, but with the knowledge gleaned during these two years, South Carolina farmers can now compete with sweet potato growers in any State in the Union.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, and Crops. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

In view of the large number of newer fertilizer materials that has appeared on the market in recent years, the pamphlet, "New Fertilizer Materials," by A. R. Merz is very timely. The author briefly describes most of these new fertilizers in a non-technical manner, giving a brief statement of their composition, preparation, and properties. This publication, issued as Circular No. 185, of the United States Department of Agriculture, will make an excellent reference for those interested in fertilizers.

A handy summary of "Fertilizer Recommendations for Florida" has been prepared by a committee of the University of Florida and is being distributed by the Agricultural Extension Service of that State. For each of the important crops, recommendations are made as to analysis and amount of fertilizer or formula, in case the farmer wishes to make his own fertilizer mixture. Complete fertilizer programs for bearing citrus groves and tobacco are included. Brief discussions of fertilizer ratios and time of fertilizers are also given. Such circulars prove helpful to farmers and advisory groups and are an important type of publication.

The question as to the best place in the soil to put the fertilizer has often been discussed, but usually with little data to substantiate observations and opinions. Lack of data on this important and controversial subject has been due largely to the great difficulty attached to conducting research work on it. Problems of the fertilizer, climate, soil, and crop must be considered. Realizing these difficulties as well as the magnitude and importance of the problem, the United States Department of Agriculture, the fertilizer industry, implement manufacturers, and State experiment stations have cooperated in conducting a research project on fertilizer placement. A progress report on work accomplished in 1930 has just been issued by G. A. Cummings, A. L. Mehring, G. H. Serviss, and W. H. Sachs entitled, "Progress Report on Mechanical Application of Fertilizers to Cotton in South Carolina, 1930," United States Department of Agriculture, Circular No. 192. As the title implies, the results to date of work still under way are given, and conclusions naturally cannot yet be taken as final. It was found that under the conditions of these experiments, fertilizers should not be in contact with the seed. On a heavy soil, fertilizer below or beside this seed was satisfactory. On lighter soils, fertilizer four inches or less under the seed was not satisfactory, but fertilizer beside the seed did not appear to be injurious in any way. Increasing the amount of fertilizer per acre was not injurious if the fertilizer was applied in an appropriate manner as mentioned above.

When stand was injured by fertilizer, the yield was not reduced in proportion to the reduction in stand. The authors believe this may have been due to the fertilizer injuring only the weaker plants that would not yield as

well as the other plants even if not injured. They say that "a degree of injury to germination may be desirable if final stand is not seriously impaired." Highest yields were obtained when the fertilizer was placed as closely as possible to the seed without seriously affecting germination. When fertilizer was applied below the seed in large amounts on limed soils, better results were obtained if part of the fertilizer was applied as a side-dressing after chopping instead of putting all of it below the seed at planting time. Irregular distribution of fertilizer decreased the yield of seed cotton.

As mentioned above, these conclusions as yet can be taken to hold only for the conditions of the experiments. Further work now under way is expected to show how broadly the results can be applied. In any case, this important and valuable work in showing the farmer how to apply his fertilizer to get the best results is much needed, and every effort should be made to carry it through to conclusion.

An interesting experiment on strawberries is under way in North Carolina in which problems connected with the fertilization of this important and popular fruit are being investigated. A preliminary report of data so far obtained has been prepared by R. A. Lineberry, J. J. Skinner, H. B. Mann, and C. B. Williams, entitled, "Results of Strawberry Fertilizer and Tillage Experiments," and issued as Agronomy Information Circular No. 64 of the North Carolina Experiment Station. The authors state that 1,500 pounds of a fertilizer analyzing 5 per cent nitrogen, 8 per cent phosphoric acid, and 6 per cent potash has given the best results under the conditions of these experiments considering yield and quality of the fruit. This fertilizer should have nitrogen from both organic and mineral sources, while the muriate seems to be the most satisfactory potash carrier. Double strength or concentrated fertilizers gave better results than ordinary strength fertilizers, using the same amounts of plant food. The addition of the so-called rare elements such as manganese, nickel, copper, and zinc was beneficial in some cases, but the results varied considerably on different soils. Applying all the fertilizer in the late summer or early fall was superior to applying part of it in the summer and part in the winter. The strawberries did best on a slightly acid soil with a pH around 6. With reference to cultivation, the authors found that cultivation given early in the summer favored total yield and earliness next season. This preliminary report will be of interest and value to all who grow strawberries on a commercial scale.

"Fertilizer and Cottonseed Meal Analyses Report, Season 1930-1931," *Dept. of Conservation and Inspection, Little Rock, Ark., Dr. W. F. Manglesdorf and G. W. Roark.*

"Commercial Fertilizers and Soil Fertility in California," Univ. of Cal., Berkeley, Cal., Ext. Cir. 57, *Oct.*, 1931, *P. L. Hibbard.*

"State Laboratory Fertilizer Report—Seed Report, Jan.-June, 1931," *State Bd. of Agr., Dover, Del., Quar. Bul., Vol.* 21, *No.* 2, *June* 30, 1931.

"Commercial Fertilizers," Agr. Exp. Sta., Lafayette, Ind., Cir. 182, *May,* 1931, *H. R. Kraybill, O. S. Roberts, O. W. Ford, L. E. Horat, and M. H. Thornton.*

"Analyses of Commercial Fertilizers," Agr. Exp. Sta., Lexington, Ky., Bul. 313, *Dec.*, 1930, *H. E. Curtis, H. R. Allen, and Lelah Gault.*

"Effect of Fall Applications of Sodium Nitrate Upon the Color, Keeping Quality, and Nitrogen Content of Apples," Agr. Exp. Sta., College Park, Md., Bul. 326, *May,* 1931, *W. W. Aldrich.*

"Inspection and Analysis of Commercial Fertilizers; Spring, 1931," *Agr. Exp. Sta., Columbia, Mo., Bul.* 306, *Aug.*, 1931, *F. B. Mumford, M. F. Miller, and L. D. Haigh.*

"Fertilizers for Vegetable Crops on Ohio Soils," Ohio State Univ., Columbus, O., June, 1931, *Department of Horticulture.*

"Analyses of Commercial Fertilizers," Agr. Exp. Sta., Clemson Coll., S. C., Bul. 276, *Aug.*, 1931, *R. N. Brackett and D. H. Henry.*

"Commercial Fertilizers in 1930-31 *and Their Uses," Agr. Exp. Sta., College Station, Tex., Bul.* 434, *Sept.*, 1931, *G. S. Fraps and S. E. Asbury.*

"Getting the Most out of Stable Manure," Univ. of Wis., Madison, Wis., Radio Circular, Oct., 1931, *C. J. Chapman.*

Soils

On reading the 1931 Annual Report of Dr. H. G. Knight, Chief of the Bureau of Chemistry and Soils, United States Department of Agriculture, one cannot help being impressed with the scope, magnitude, and diversity of work being done by that important unit of the Government. The investigations range from the suitability of soils as sites for national monuments to the effect of light on the keeping quality of foods. In addition to the highly important fundamental pure research conducted, a surprisingly large number of projects deal with everyday practical problems. American agriculture is indeed fortunate in being served by such a competent organization.

The importance of lime in conjunction with intelligent cropping and fertilization in building up and maintaining the productivity of soils cannot be over-emphasized. Good cropping systems or fertilizer practices will not solve the productivity problem if lime is lacking, nor will the greatest value of lime be recognized if the other factors are limiting. The secret of a productive soil is largely a matter of a consistent and well-balanced program of soil management.

The liming side of the question is ably and practically presented by C. M. Linsley in Illinois Agricultural Experiment Station Circular No. 375 entitled, "Limestone, the Key to Soil Building and Higher Crop Yields." Results of using lime on farms are given, showing the profitableness of correct liming. Objections to the use of lime are given and answered. Testing soils to determine whether they need lime and the forms of lime to use are briefly considered. The author also discusses fertilizers in connection with soil fertility, recognizing that lime is only part of the problem, as mentioned above.

"How to Obtain Soil Samples for Analysis," Agr. Coll., Fort Collins, Colo., Ext. Bul. 293-A, Dec., 1930, R. D. Hockensmith.

"The Relation of Forest Composition and Rate of Growth to Certain Soil Characters," Agr. Exp. Sta., New Haven, Conn., Bul. 330, July, 1931, H. W. Hicock, M. F. Morgan, H. J. Lutz, Henry Bull, and H. A. Lunt.

"The Effect of Soil Reaction on the Growth of Tomatoes and Lettuce and on the Nitrogen, Phosphorus, and Manganese Content of the Soil and Plant," Agr. Exp. Sta., Lexington, Ky., Res. Bul. 314, Mar., 1931, E. M. Emmert.

"Improving Garden Soils," Agr. Exp. Sta., New Brunswick, N. J., Ext. Bul. 90, Aug., 1931, H. R. Cox.

"Some Nitrogen Relationships in Muck Soils," Agr. Exp. Sta., Ithaca, N. Y., Memoir 137, Aug., 1931, B. D. Wilson and G. R. Townsend.

"Report of Proceedings of the Second Southwest Soil and Water Conservation Conference," Agr. Exp. Sta., Stillwater, Okla., Cir. 79, Oct., 1931.

"Chemical Composition of Soils of Cameron, Coleman, Dallas, Erath, Harris, Reeves, Rockwall, and Tarrant Counties, Agr. Exp. Sta., College Station, Tex., Bul. 430, July, 1931, G. S. Fraps.

"The Soils of Texas," Agr. Exp. Sta., College Station, Tex., Bul. 431, July, 1931, W. T. Carter.

"Manganese in Texas Soils and Its Relation to Crops," Agr. Exp. Sta., College Station, Tex., Bul. 432, Aug., 1931, E. C. Carlyle.

"Soil Survey of The Gila Bend Area, Ariz.," U. S. D. A., Washington, D. C., Series 1928, No. 4, F. O. Youngs, W. G. Harper, and M. R. Isaacson.

"Soil Survey of The Paradise-Verde Area, Ariz., U. S. D. A., Washington, D. C., Series 1928, No. 6, F. O. Youngs, T. W. Glassey, E. N. Poulson, and M. R. Isaacson.

"Soil Survey of The Santa Ynez Area, California," U. S. D. A., Washington, D. C., Series 1927, No. 15, E. J. Carpenter, T. W. Glassey, and R. Earl Storie.

"Soil Survey of The Arkansas Valley Area, Colorado," U. S. D. A., Washington, D. C., Series 1926, No. 24, A. T. Sweet and Wayne Inman.

"Soil Survey of The Jerome Area, Idaho," U. S. D. A., Washington, D. C., Series 1927, No. 16, E. N. Poulson and J. A. Thompson.

"Soil Survey of Buchanan County, Iowa," U. S. D. A, Washington, D. C., Series 1926, No. 33, T. H. Benton, M. H. Layton, and J. H. Zentmire.

"Soil Survey of Butler County, Iowa," U. S. D. A., Washington, D. C., Series 1928, No. 5, J. Ambrose Elwell and E. N. Poulson.

"Soil Survey of Union County, Iowa," U. S. D. A., Washington, D. C., Series 1927, No. 14, J. Ambrose Elwell and W. J. Moran.

"Soil Survey of Crawford County, Kansas," U. S. D. A., Washington, D. C., Series 1928, No. 3, M. H. Layton, J. A. Kerr, E. W. Knobel, H W. Higbee, and R. W. O'Hara.

"Soil Survey of Custer County, Nebraska,"

U. S. D. A., Washington, D. C., Series 1926, No. 36, F. A. Hayes, M. H. Layton, E. A. Nieschmidt, C. H. Hayes, A. N. Huddleston, and S. S. Diedrichs.

"Soil Survey of St. Lawrence County, New York," U. S. D. A., Washington, D. C., Series 1925, No. 34, Clarence Lounsbury, H. G. Lewis, F. B. Howe, and Salvador Diadato.

"Soil Survey of Williamsburg County, South Carolina," U. S. D. A., Washington, D. C., Series 1928, No. 7, W. J. Latimer, B. H. Hendrickson, F. R. Lesh, A. H. Hasty, W. E. Tharp, and C. S. Simmons.

Crops

Of particular interest to our readers and adding to the literature on the nutrition of apple trees, are the results of the research work of A. E. Murneek and E. J. Gildehaus. Reported in Bulletin 300 "Progress in Agricultural Research," the report of the Director of the Missouri Agricultural Experiment Station for the year ending June 30, 1931, the results show:

"A marginal burning of leaves was produced in dwarf apple trees growing in loose soil in tubs by heavy applications of nitrogen fertilizers. This suggested potassium starvation. Apple trees were then grown in sand cultures and fed increasing amounts of nitrogen. The marginal burning of leaves was again produced. By increasing the amounts of potassium the harmful effects of relatively large amounts of nitrogen were obviated."

With fertilization a growing subject of interest among orchardists, the results of this research will undoubtedly reach many sections. This work, is, of course, only one of a great many projects reported in the survey of the activities of the Missouri Experiment Station.

"Small Grain Crops in Alabama," Agr. Exp. Sta., Auburn, Ala., Cir. 60, Aug., 1931, R. Y. Bailey and J. L. Seal.

"Nectar and Pollen Plants of California," Agr. Exp. Sta., Berkeley, Calif., Bul. 517, Oct., 1931, G. H. Vansell.

"Girdling Grape Vines," Agr. Exp. Sta., Berkeley, Calif., Ext. Cir. 56, Sept., 1931, H. E. Jacob.

"Factors Influencing the Establishment of Irrigated Pastures in Northern Colorado," Colo. Exp. Sta., Fort Collins, Colo., Bul. 378, July, 1931, Herbert C. Hanson.

"Report of the Director for the Year Ending June 30, 1930," Agr. Exp. Sta., Storrs, Conn., Bul. 171, Mar., 1931.

"Sweet Potatoes," Agr. Ext. Serv., Gainesville, Fla., Bul. 61, Apr., 1931, A. P. Spencer.

"Work and Progress of The Agricultural Experiment Station for the Year Ending December 31, 1930," Agr. Exp. Sta., Moscow, Idaho, Bul. 179, June, 1931.

"Tomato Color as Related to Quality in the Tomato Canning Industry," Agr. Exp. Sta., Lafayette, Ind., Bul. 350, Apr., 1931, John H. MacGillivray.

"Report of Moses Fell Annex Farm, Bedford, Indiana," Agr. Exp. Sta., Lafayette, Ind., Cir. 183, June, 1931, H. J. Reed and H. G. Hall.

"Tame Pastures in Kansas," Agr. Exp. Sta., Manhattan, Kan., Bul. 253, Jan., 1931, A. E. Aldous and J. W. Zahnley.

"Forty-third Annual Report of the Agricultural Experiment Station of the University of Kentucky for the Year 1930," Univ. of Ky., Lexington, Ky.

"Studies on Sugar Cane Roots," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 223, July, 1931, T. C. Ryker and C. W. Edgerton.

"Sugarcane Variety Test Fields, Part I, Sugar Cane Variety Report for Season 1930-31, Part II," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 226, July, 1931, C. B. Gouaux and E. C. Simon.

"Root Crops for Forage in Michigan," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 216, Aug., 1931, H. C. Moore and E. J. Wheeler.

"The Stone Cells of Pear Fruits, Especially the Kieffer Pear," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 113, May, 1931, J. W. Crist and L. P. Batjer.

"Hard Seeds in Legumes," Agr. Exp. Sta., Bozeman, Mont., Bul. 248, July, 1931, W. O. Whitcomb.

"The Cause and Prevention of Mechanical Injuries to Potatoes," Agr. Exp. Sta., Lincoln, Neb., Bul. 260, Aug., 1931, H. O. Werner.

"The University Fruit Farm at Union, Nebraska," Agr. Exp. Sta., Lincoln, Neb., Cir. 43, Sept., 1931, C. C. Wiggans.

"Peonies in the Garden," Agr. Exp. Sta., New Brunswick, N. J., Cir. 250, Aug., 1931, Charles H. Connors.

"Some Effects of Legumes in Relation to Economical Crop Production," Agr. Exp. Sta., Geneva, N. Y., Bul. 596, Aug., 1931, R. C. Collison.

"Vegetable Seed Treatment," Agr. Exp. Sta., Geneva, N. Y., Bul. 597, Sept., 1931, E. E. Clayton.

"Orchard Management," Agr. Exp. Sta., Geneva, N. Y., Cir. 121, Mar., 1931.

"Source and Care of Cotton Planting Seed in Relation to the Length of Staple," Agr. Exp. Sta., State College Sta., Raleigh, N. C., Tech. Bul. 42, Aug., 1931, J. H. Moore and J. A. Shanklin.

"Better Lawns in North Carolina," Agr. Ext. Serv., State College Station, Raleigh, N. C., Ext. Cir. 189, Oct., 1931, C. B. Williams.

"Rhubarb Culture," Agr. Ext. Serv., Columbus, Ohio, Bul. 109, Dec., 1930, L. M. Montgomery.

"Vegetable Forcing in Ohio," Agr. Ext. Serv., Columbus, Ohio, Bul. 110, Nov., 1930, H. D. Brown, I. C. Hoffman, and Alonzo Marion.

"Home Gardening," Agr. Ext. Serv.. Columbus, Ohio, Bul. 116, Mar., 1931, E. R. Lancashire.

"Onion Culture in Ohio," Agr. Ext. Serv., Columbus, Ohio, Bul. 118, Apr., 1931, H. D. Brown.

"The Propagation of Flowers by Cuttings and Seeds," Agr. Exp. Sta., Wooster, Ohio, Bul. 487, Sept., 1931, W. W. Wiggin.

"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 153, Nov.-Dec., 1931.

"Wheat Varieties on the High Plains of Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul. 200, May, 1931, H. H. Finnell.

"The Pennsylvania Agricultural Experiment Station 44th Annual Report," Agr. Exp. Sta., State College, Pa., Bul. 266, July, 1931.

"Lawns," Agr. Exp. Sta., State College, Pa., Cir. 143, Oct., 1931, Nickolas Schmitz.

"Department of Agriculture Immigration of Virginia," Dept. of Agr., Richmond, Va., Bul. 287, Nov., 1931.

"The Relation of Air Conditions to Tobac co Curing," Agr. Exp. Sta., Madison, Wis., Res. Bul. 110, July, 1931, James Johnson and W. B. Ogden.

"Making the Most of Forest County Land," Ext. Serv., Madison, Wis., Spec. Cir., May, 1931, K. L. Hatch and H. M. Knipfel.

"Wheat Growing in the Southeastern States," U. S. D. A., Washington, D. C., Farmers' Bul. 885, (Rev.) July 1, 1931, Clyde E. Leighty.

"How to Grow Rice in the Sacramento Valley," U. S. D. A., Washington, D. C., Farmers' Bul. 1240 (Rev.) June, 1931, Jenkin W. Jones.

"Plum and Prune Growing in the Pacific States," U. S. D. A., Washington, D. C., Farmers' Bul. 1372 (Rev.) Aug., 1931, C. F. Kinman.

"Planting and Care of Lawns," U. S. D. A., Washington, D. C., Farmers' Bul. 1677, Oct., 1931, H. L. Westover and C. R. Enlow.

"Factors for Converting Percentages of Nitrogen in Foods and Feeds into Percentages of Proteins," U. S. D. A., Washington, D. C., Cir. 183, Aug., 1931, D. Breese Jones.

Economics

Much has been said about the advantages accruing to farmers who strive for better quality in the produce which they grow. It has often been hard to measure these advantages in dollars and cents. Therefore, two new bulletins based on statistical research on the relation of quality to market prices assume importance.

Alabama Bulletin 235, "The Relation of Quality of Cotton to Prices Paid to Farmers in Alabama," by J. D. Pope and Carl M. Clark, of the Alabama Polytechnic Institute, is the result of a study "undertaken to determine the extent to which differences paid in central markets obtained in farmers markets, and to determine whether or not an economic basis exists for the improvement of the quality of the cotton produced in the State." Among their conclusions the investigators point out that "there was a definite tendency on the part of cotton buyers to pay farmers more for the better grades than for the poorer grades." "The economic reward for high yields per acre was a more important factor influencing the variety of cotton grown by farmers than the reward for staple length." "The payment of staple premiums and discounts for individual bales is necessary before farmers will select varieties on the basis of staple length instead of only on the basis of yield of lint per acre and gin turnout."

Bulletin No. 3 "Maine Potato Quality Related to Market Prices," by Frederick V. Waugh, Charles M. White, and Malcolm R. Hersey, carries among its conclusions the statement that the degree of prosperity enjoyed by the Maine potato industry in the coming years will depend partly on the quality of potatoes offered for sale.

"Harvesting the Corn Crop in Illinois," Agr. Exp. Sta., Urbana, Ill., Bul. 373, Sept., 1931, P. E. Johnston and K. H. Myers.

"The Secular Movement of Corn Prices," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 140, June, 1931, Geoffrey S. Shepherd.

"Market Preferences and Premiums for Maine Potatoes," Agr. Exp. Sta., Orono, Me., Bul. No. 2, July, 1930, Frederick V. Waugh, Charles M. White, and Malcolm R. Hersey.

"The Onion Situation in the Connecticut Valley," Mass. State College, Amherst, Mass., Ext. Leaflet 138, July, 1931, H. B. Rowe and R. L. Mighell.

"Trends in Purchasing Power and Cost of Production of Fruits," Agr. Exp. Sta., East

Lansing, Mich., Tech. Bul. 120, *Aug.*, 1931, *G. N. Motts.*

"Minnesota Agricultural Indexes of Prices, Quantities, and Cash Incomes, 1910-1927," *Agr. Exp. Sta., Univ. Farm, St. Paul, Minn., Tech. Bul.* 72, *Dec.*, 1930, *Albert G. Black and Dorothea D. Kittredge.*

"Studies in Economics of Apple Orcharding," Agr. Exp. Sta., Durham, N. H., Bul. 257, *May*, 1931, *H. C. Woodworth and G. F. Potter.*

"Land Utilization in a Southeastern Ohio County," Agr. Exp. Sta., Wooster, Ohio, Bul. 485, *Aug.*. 1931, *J. H. Sitterly, H. R. Moore, and J. I. Falconer.*

"Systems of Farming in Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul. 199, *Apr.*, 1931, *P. H. Stephens and Emil Rauchenstein.*

"Prices Paid to Producers of South Dakota Farm Products, 1890-1930," *Agr. Exp. Sta., Brookings, S. D., Bul.* 259, *Apr.*, 1931, *J. L. Orr.*

"Car Lot Shipments of Fruits and Vegetables from Stations in the United States for the Calendar Years 1928 *and* 1929," *U. S. D. A., Washington, D. C., Statistical Bul.* 35, *Oct.*, 1931.

"The Marketing and Distribution of Fruits and Vegetables by Motor Truck," U. S. D. A., Washington, D. C., Tech. Bul. 272, *Oct.*, 1931, *Brice Edwards and J. W. Park.*

Cut More Alfalfa by Cutting Less

(*From page* 18)

sections for cattle. If the animals are allowed to graze the crop long before it has approached blossoming, the fields will be short-lived. If the tops are allowed to grow out of their succulent, watery condition so that the stems will harden somewhat before grazing begins, the fields will remain in good condition over a number of years. Not only that, there is less danger of bloat in cattle. The greater part of the acreage of alfalfa in Argentina is used for pasture and there the top growths are allowed to approach maturity before grazing is begun."

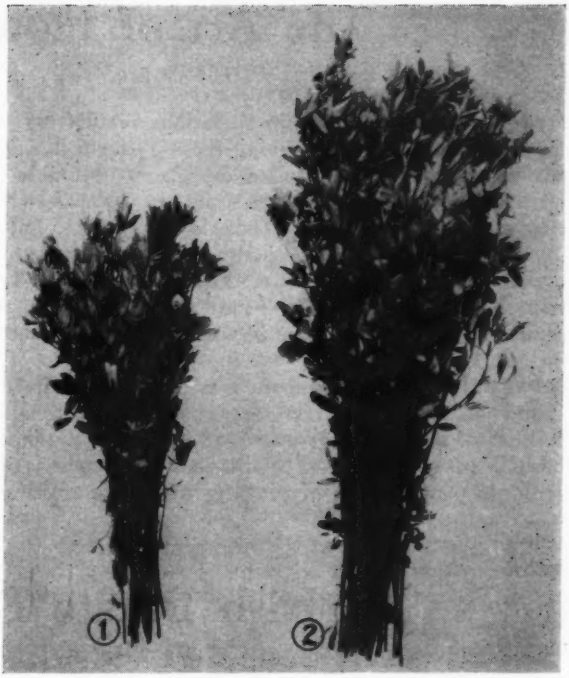
In general practice Mr. Graber recommends that the harvest be delayed so as to cut as near the full-bloom stage as possible, providing the hay does not become too coarse. This would mean that if the first crop grew very rank and began to lodge, early cutting before blossoming might be necessary. However, if this is not the case, then the crop is cut later and thus allowed to make more root storage. Because the second growth will

"Yellowing" of Second Growth—Following severe winters, the time of cutting the first growth of alfalfa may cause important variations in the character of subsequent growth. A difference of only four days in the time of cutting the first crop resulted in the above variation in the second growth of alfalfa on August 5, 1922. The hardy Grimm alfalfa in Plot (1) was cut for the first time on June 20, 1922, when well in blossom, while that in Plot (2) was cut four days later on June 24. The previous winter had been very unfavorable. Storage of organic reserves is very rapid during blossoming and apparently four days of such storage resulted in the much greater recuperation of the winter injured tissues in plants of Plot (2) than in Plot (1) where the alfalfa turned yellow and become stunted following the earlier removal of the first growth.

usually be finer and leafier than the first, it can be cut near the full-bloom stage and still afford a good quality of hay.

"On account of winter injury, fall cutting and pasturing, especially of alfalfa which is in a succulent and rapidly growing condition, should be avoided where the growing season is short and where permanence is desired," he believes. In Wisconsin this plan, of course, means but two cuttings annually and, as the data have shown, larger average yields have been obtained over a period of five years from two crops annually than from three. However, where alfalfa is grown in short rotations and permanence is not essential, cutting may be done earlier in the northern regions.

"In climates with long growing seasons and very mild winters, alfalfa is often cut from six to ten times annually. Where such fields are cut continuously before blossoming has begun, the productivity and longevity are greatly reduced.



Early cutting retards subsequent top growth of alfalfa. The second crop (1) of plots of alfalfa which had been cut three times in tenth bloom in 1921 and 1922, grew at the rate of .35 inches daily for the period of June 13 to July 17, 1923, or a total of only 12 inches in 34 days. The second crop of similar plots (2) which had been cut twice annually when in full bloom in 1921 and 1922 grew at the rate of .63 inches daily between June 20 and July 17, 1923, or a total of 17 inches in 27 days. Such greater rapidity of growth was very noticeable in the first and second crops of 1923, 1924, and 1925, the last three years of the trial.

Crowns Are No Guide for Cutting

"The clipping of the new top growths, which occurs at the crowns of alfalfa plants when delayed cutting is practiced, has not been found harmful as was once thought. This guide to cutting time now has become merely a matter of history rather than a guide in the management of alfalfa fields."

Allowing the plants more time to grow seemed to have a beneficial effect on winter injury. For example: "The amount of winter injury was closely related to the frequency of removal of top growth and the amount of top growth permitted to remain uncut in the fall and winter months. Where Grimm and Common alfalfa were compared, the Grimm variety had a much higher degree of winter hardiness for all cutting treatments than did Common alfalfa.

Too frequent cutting also means that root growth, as well as top growth, is checked. When the root system is small, therefore, the plant suffers more from drought; and also is less able to absorb elements of soil fertility to use in building the plant as a whole.

The Art of Plowing

(*From page* 24)

Hydro-electric equipment in operation showed the farmer labor-saving methods which might be installed on the farm at reasonable cost. A tented city sprung up over night. Boards of Trade and Municipal Councils, feeling that the farmers' interests were their own, contributed in funds and personal effort to make the occasion a success.

No outside attractions, such as are found on midways, have ever been permitted. The affair is purely an exhibition of the farmer at his best, demonstrating the art of plowing and exhibiting well-trained and well-fitted farm horses.

Notable among consistent winners have been residents of Indian reservations. These men, forsaking the ways of their forebears, have become enthusiastic farmers and expert plowmen.

Briefly, the Association has stimulated a keener desire among the good farmers of the Province to employ more careful methods in cultural practices, to utilize modern and labor-saving equipment, and to assume a broader sphere of usefulness in the national life of the country.

An Irish Potato Record

(*From page* 16)

it is capable of producing maximum crop yields under favorable weather conditions.

"During the fall of 1930, this land was thoroughly disced turned, smoothed, re-turned, and smoothed again, so that the residue of previous crops was thoroughly broken up to decompose easily. It was laid off in rows in late January and bedded with an 8-inch middle burster on Feb. 13. On the same date, I applied 2,000 pounds of 5-7-7 (NPK) mixed fertilizer to the acre plot. This fertilizer was a mixture obtained by the United Produce Association for all of its growers. The potash in the mixed goods was derived 50 per cent from muriate of potash and 50 per cent from sulphate of potash.

"Seven and one-fourth 10-peck bags of Prince Edward Island Cobblers were planted on the acre on February 25. They were spaced 11 inches apart on 33-inch rows by means of a planter, and having used a planting machine, a uniform depth of five inches was secured.

"The plot was cultivated four times during the growing season, by means of weeders, subsoil plows, and sweeps. The weeder was run over the beds just before the plants showed themselves above ground on April 2. The subsoil plows followed on April 18, and on the same date, the plot was cultivated with a 16-inch saddle plow. On April 27 the plot was 'laid by' with a 26-inch sweep. No further cultivation was done, but on April 30 the crop was sprayed with Bordeaux mixture for the first and only time, as a precaution against the possibility of an outbreak of disease or insect infestation.

"On the same day that I weeded the crop, I applied a side-dressing of fertilizer made up of 160 pounds of nitrate of soda and 60 pounds of muriate of potash, a side-dressing analysis of approximately 13-0-13 (NPK). This extra fertilization only cost me $7.09, and I feel that it repaid me far more than it cost."

In checking the yields of the con-

test plots, the County Agents of the various competing counties only were allowed to be interested onlookers, while some one designated by the Clemson College Extension Service did the actual work of checking the yields. Accordingly, L. W. Alford, County Agent for Colleton county recorded Mr. Bostick's yield on June 3, and found the figures which I gave you in the second paragraph of this article—a total of 219.6 barrels of potatoes on one acre. Figuring this out on a bushel basis, we find a total of 602.6 bushels, an almost unheard of figure for Southern potatoes.

Market conditions were extremely poor at the time of Mr. Bostick's harvest, and so only the No. 1 potatoes were marketed. Part of the No. 2's and the culls were fed to the hogs on the farm; and the rest were given away. The total cost of producing and marketing this yield, according to Mr. Bostick's contest record book, was $129.14, and the net value of the potatoes was $235.26, giving him a profit of $106.12 on his one-acre plot.

Beaufort county, nestled among the Sea Islands of the South Carolina Coast, has long been a producer of potatoes. Many farmers have made big yields in the past, but never before has such a record come forth. Weather conditions, growing seasons, and other factors which prevail in the Southeastern potato-producing territory, are not conducive to tremendous yields of potatoes. Seventy-five barrels per acre are a good average yield. Many people have doubted that Mr. Bostick's achievement was possible. I saw the crop, checked and rechecked the figures, and summarize my observations as follows:

The exceedingly thorough fall preparation of the soil helped to conserve the moisture which was so badly needed during the growing season. The use of a combination of sulphate and muriate of potash in the fertilizer instead of just muriate alone, the continued utilization of leguminous cover crops, and the fact that Ben Bostick is one of the coming farmers of the Southeast, all joined in to push the old Palmetto State into the limelight as potato producer.

The Inquiring Mind

(*From page* 15)

the other contained far less phosphoric acid and much more potash.

Relative to fertilizers for corn, Dr. Brooks, in Bulletin No. 14, states that his experiments showed that soils differed widely in their requirements. Potash, however, much more often proved beneficial, or proved much more beneficial, than either nitrogen or phosphoric acid. Potash, as a rule, increased to the greatest extent the yield of both grain and stover; but its effect upon stover production was greater than upon grain production. Barnyard manures are, as a rule, relatively deficient in potash, no doubt because of the loss of a large proportion of the urine, which contains about four-fifths of the total potash excretion.

He further concludes that the relative deficiency of potash in many of our soils may be largely accounted for from the following facts:

Manures usually lack this ingredient. Farmers who have used commercial fertilizers as a rule bought phosphates or fertilizers rich in phosphoric acid and containing little or no potash. All fodders, pasture grasses, and

hay are rich in potash, and our farmers have devoted a large share of their land to the production of those crops. The relative deficiency of potash in so many soils, shown now by the results of the work of two seasons, justifies the following general advice, in the belief of Dr. Brooks:

In breaking up sod land for crops, particularly that which is in fair condition but which has been under ordinary farm management, if fertilizers only are to be used, apply those which are rich in potash. Use material which will supply 80 to 100 pounds of actual potash, from 25 to 30 pounds of phosphoric acid, and from 15 to 20 pounds of nitrogen per acre. If a special corn fertilizer is to be used, apply only a moderate quantity, say 400 to 500 pounds per acre, and use with it about 125 pounds of muriate of potash. It is believed this combination will produce as good a crop as 800 to 1,000 pounds of corn fertilizer, and it will cost considerably less. For corn, apply about four cords of ordinary barnyard manure and 100 pounds of muriate of potash per acre. For fodder or ensilage corn, use either in fertilizers or with manure, one-fourth more potash than above recommended.

In the Massachusetts experiments, all fertilizers and manures were applied broadcast and harrowed in, which Dr. Brooks considered the best method. (*Mass. Agr. Col. Bul. No.* 14, 1891.)

Dr. Brooks has not only been an indefatigable worker in his profession, but wonderfully interested in subjects other than his specialties. Always, he has kept himself well informed regarding the work of other scientists and has sought to determine for himself the true value of conclusions, which to him appeared doubtful. Like every true naturalist, he is an exceedingly close observer, and often has been able correctly to interpret some of the mysteries of nature that baffled others. He is an admirer of nature in all her moods and aspects, and an accomplished botanist and lover of flowers, plants, and animals. It has been one of his greatest pleasures to work in his garden, where he has produced vegetables, fruits, and flowers of excellent quality.

He is a great reader, not only in his own special subjects, but in the varied fields of politics, biography, and literature. Doing his own thinking, he is ever ready to express a shrewd opinion on current topics. He has proved himself a loyal citizen, taking an active and useful part in town affairs. He also has been an active member and officer of the Unitarian Church with which he is affiliated. Loving his Alma Mater, and deeply interested in her educational policy, he likewise has been a keen student of the entire subject of present-day educational problems.

A strong fraternity man, he was one of the founders of the national Phi Sigma Kappa organization.

His Other Side

His home has ever been the scene of true domestic joy. There, he has spent his happiest hours, with his two children, long since grown to maturity, of whom he is deservedly proud, and with his grandchildren, in whom he takes delight.

Children appeal to his heart, and they respond to his kindliness. It has been his custom for many years to gather them around a resplendent Christmas tree upon his home lawn, and take part in their festivities. Now, though the May of his life is falling into "the sear, the yellow leaf," he continues his happy Yuletide parties, to the delight of the children of the neighborhood.

We trust that this great man—"learned in agricultural science"—may be blessed with good health, and enjoy the genial companionship of his family and friends, until the sun goes down in glory at the close of his distinguished career of inspiration and inestimable service.

Industries Become Garden-minded

(*From page* 10)

ing family use.

These Sefton gardens are probably the oldest permanent industrial gardens in Indiana and among the best.

For size, as well as excellence in actual production, the big industrial gardens of the International Harvester Company, at Richmond, equal, if not surpass, anything of the kind in Indiana. While these remarkable gardens are only one year old, they have demonstrated their value both to the company and its employees.

Last spring, under the personal supervision of the General Superintendent, the company acquired, by rental, 39 acres for industrial garden purposes. The land was plowed and well fitted. It then was surveyed and plotted. Approximately 5,000 square feet were allowed to each individual garden plot.

An attractive picnic ground, well supplied with water and shade, was maintained as a part of these gardens.

On these 39 acres, 194 employees of the International Harvester Company had free garden facilities. The plots were numbered and were assigned to employees having inadequate home gardens. Seed and fertilizer were supplied by the company at cost.

These gardens were largely devoted to vegetables for winter use, and the company gave assistance to their employees in canning their own garden products. Company supervision of the gardens extended throughout the season.

While the cost of this splendid industrial garden project was considerable, the company considers it a very small item of expense in comparison to the substantial benefits accruing to their employees. Indirectly, of course, the industry benefits, for anything which contributes to the benefit of the employees is also bound to prove beneficial to the company.

Another industrial garden which deserves mention is that of the Studebaker Corporation, at South Bend. Here, the industrial plots were 40 x 140 feet. They were plowed and staked ready for the employees, who were supplied with seed and fertilizer as needs demanded. The employees welcomed such assistance, and the company is considering the enlargement of these gardens, and also the advantage of fall plowing and more adequate soil fertilization.

At Kokomo, the Dirigold Corporation made it possible for every employee to have a garden. Those who did not have a garden at home were cared for in a company industrial garden. The individual plots were 40 x 130 feet, and mostly were planted in potatoes. The company supplied the land, plowed, and fitted it, and gave other assistance in supplying seed as needed. The employees did the gardening, and were awarded with all the crops their individual plots produced.

Industries Cooperate

Throughout Indiana there are dozens of industries which, in one way or another, are aiding materially in this garden movement. Many industries have interested themselves in the promotion of community garden enterprises. They not only are giving the movement valuable moral support, but in many instances are contributing active aid in supplying funds for inaugurating and conducting the work.

Industries which are sponsoring industrial gardens for their own employees are also actively cooperating with community and home garden projects. This is particularly true in industrial communities where employment gardens are now so successfully being made a part of local relief programs for unemployment. In this connection, only a few of the many cooperating industries can be men-

tioned, but similar credit is due many others.

The widely-famed Muncie Community Gardens, story of which was told in a previous issue of BETTER CROPS WITH PLANT FOOD, were located on 40 acres donated by the Warner Gear Company. The Ball Bros., Can Company also contributed largely to the outstanding success of these remarkable gardens. The Jeffersonville Community Gardens were made possible by the unstinted cooperation of the American Car and Foundry Company. In Gary, the extensive employment gardens were largley financed by the American Sheet and Tin Company. In Kokomo, the Kokomo Supply Company, through its president, was largely responsible for the fine showing made in the community garden work.

And so it goes. Industrial garden-mindedness is becoming the rule rather than the exception. Cooperation between industrial institutions and their employees, via the industrial garden route, is proving a substantial aid in the improvement of many economic conditions.

Pasture Publicity

(*From page* 11)

January was known as "Better Pastures Month." To begin with, a combined meeting of selected farmers, representatives of the fertilizer trade, and a few of the county bankers was held on January 5. A total of 50 interested men were present to hear the discussion led by J. B. Abbott of the National Fertilizer Association.

The interest was good and 21 farmers signified their intentions to treat their pastures. Of this number 15 stated they would treat 178 acres. This number represented 1,000 acres of pasture land and 500 cows. Six others stated they would improve some pasture, but stated no definite acreage.

Twice during each week following, extension cards carrying a definite phase of pasture work were sent to the complete mailing list of farmers. A total of eight different cards were mailed out. The same story enlarged upon was published on the following day in the Rutland *Daily Herald*, one of the largest State papers. On January 16 one full page of this same paper was devoted to the pasture campaign. The space was partly taken by six of the county banks which gave a large advertisement along with some pasture message.

To close the campaign, meetings were held in every community in the county. These began on January 26 and continued to February 3, at the rate of two per day. A special film strip showing local phases of pasture improvement was prepared and shown at these meetings. Dr. E. Van Alstine, State Extension Agronomist, was the principal speaker. Questionnaire cards were passed out at these meetings and are tabulated in the following highlights of the campaign.

1. 1,050 county farmers were reached with direct semi-weekly pasture information.

2. The same number and many others were reached with the news stories in the press.

3. The Rutland *Daily Herald* carried one full page devoted almost entirely to pasture information on January 16. This space was provided by the paper and some of the county banks.

4. The series of county meetings brought 105 actual farmers, interested in better pastures, together to discuss what had been done in the county and the instructions given as to how they

might accomplish the same.

5. A definite response on questionnaire cards showed the following results:

Total number farmers answering	90
Acres pasture owned by these men	5,326
Number of farmers who will fertilize	63
Acres this number will treat	506
Total number milk cows represented	2,353
Number that will fence and rotate	51
Number wishing a personal visit from the county agent regarding their pasture problems	66

In this summary no attempt has been made to measure the indirect response to this campaign. There undoubtedly were many acres of pasture fertilized by farmers reading of the program in the press, receiving weekly cards, and not attending the meetings.

The Response of Oats and Hay to NPK

(*From page* 8)

yield of 0.68 of a ton more on first year timothy and 1.04 tons more on the second, than did the heavy application of incomplete fertilizer. While it is quite true one year's results cannot be considered as conclusive, the above increases due to potassium are decidedly significant.

In the spring of 1931, in order to make the other two crops in the rotation more productive and at the same time maintain the increase of yields on timothy, it was decided to again revise the fertilizer treatments. The rotation sequence was left as before. It was thought advisable to apply the nitrate of soda and superphosphate mixture, and also the complete fertilizer mixture, to the first year oats and third year timothy, rather than to third and fourth year timothy. It was felt that the fertilizer applied to the oat crop, would increase the yield of this crop and, also, be more likely to insure a more vigorous catch of clover the following year.

The amount of the fertilizer applied to the two crops was left the same as in the previous arrangement, but an additional 75 and 150 pounds of nitrate of soda were added to the light and heavy set of treatments respectively, on the clover and fourth year timothy.

Table III shows the yield of all four crops on duplicate plots, together with the average yield of the two duplicates.

Clover which was intended to follow oats in the rotation failed to survive in 1931 and so was replaced by a catch crop of oats and peas. This crop was harvested for hay, and received only an application of nitrate of soda in 1931, with no previous treatment since 1929. The increase in yield was largely due, therefore, to the 1931 application, only a small amount being due to the carry-over from fertilizer applied previously. The crop showed an average increase over check of 0.29 of a ton on the plot receiving the light treatment, and 0.62 of a ton on that receiving the heavy application of nitrate of soda.

The fourth year timothy plots received a dressing of 75 and 150 pounds, respectively, of nitrate of soda in 1931. However, in addition to any beneficial effects the nitrate of soda may have had, the yield of the crop in 1931 showed a decided response to the fertilizer applied the previous year.

The two averages marked with an asterisk (*), indicate the yields on those plots which received a light and

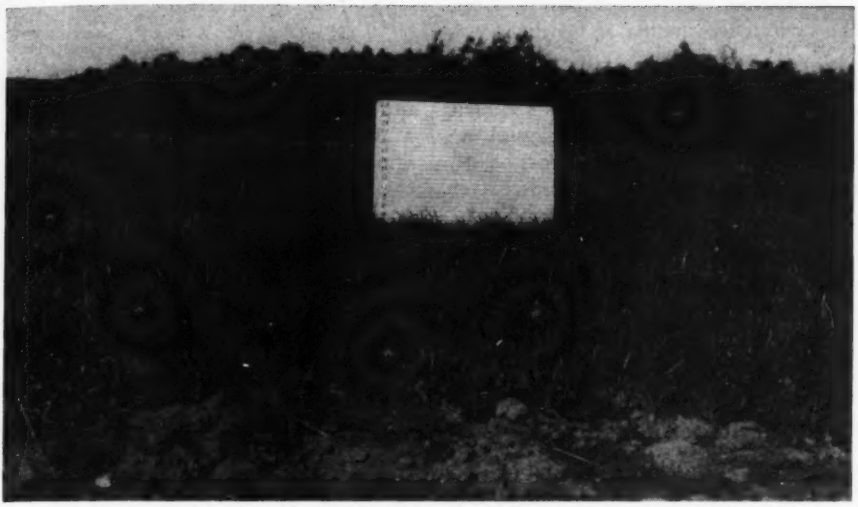
TABLE III 1931

TREATMENT*	Crops and Yields			
	Oats	Clover (O.P.)	Timothy (O.P.)	Timothy
	bus.	tons	tons	tons
75 lbs. N. & 200 lbs. P. applied to oats & 3rd year timothy	33.0	0.61	0.68	0.75
75 lbs. N. to clover and 4th year timothy	23.6	1.20	0.84	1.46 (*)
Average of duplicate plots	28.3	0.90	0.76	1.10
75 lbs. N. 200 P. 50 K. applied to oats & 3rd year timothy	32.4	0.61	1.10	1.06
75 lbs. N. to clover and 4th year timothy	43.0	1.20	1.66	2.14
Average of duplicate plots	37.7	0.90	1.38	1.60
150 lbs. N., 400 P. applied to oats and 3rd year timothy	30.6	0.78	0.74	1.24
150 lbs. N. to clover and 4th year timothy	31.2	1.69	1.02	1.96 (*)
Average of duplicate plots	30.9	1.23	0.88	1.60
150 lbs. N., 400 P., 100 K. applied to oats & 3rd year timothy	44.8	0.78	1.62	1.69
150 lbs. N. to clover and 4th year timothy	62.4	1.69	2.38	2.30
Average of duplicate plots	53.6	1.23	2.00	1.99
No Fertilizer check	8.8	0.37	0.66	0.83
No Fertilizer check	24.1	0.86	0.79	1.58
Average of duplicate plots	16.4	0.61	0.72	1.20

* N:—Nitrate of Soda P:—Superphosphate K:—Muriate of Potash

heavy applications of nitrate of soda and superphosphate in 1930, and a light and heavy application of nitrate of soda alone, in 1931. The lower figure refers to the check, and the other two averages represent the yields on plots treated with complete fertilizer in 1930 and nitrate of soda in 1931. On the plots previously treated with nitrate of soda and superphosphate only, the heavy application alone showed a yield higher than the check. The plot which previously received the light application of complete fertilizer showed a yield of 0.50 of a ton, higher than the one treated only with the two constituents, while the heavy application showed a yield of 0.39 of a ton more from the plot treated with complete fertilizer.

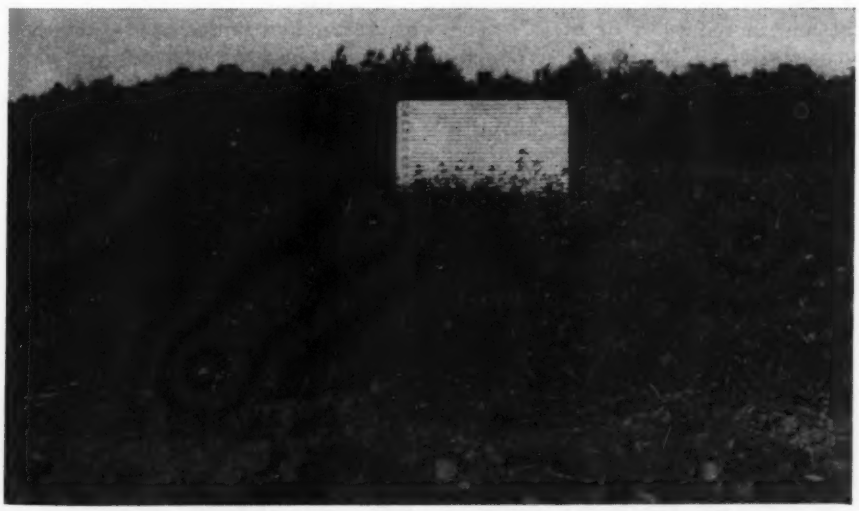
The oat crop, which received light and heavy dressings of complete and incomplete fertilizer in 1931, showed quite a decided response to all the fertilizer treatments, although the difference between the light and heavy dressings of incomplete fertilizer was very slight, only 2.6 bushels. Both, however, were considerably higher than the check. The crop showed a decided response to complete fertilizer. The light application of the mixture containing the three ingredients showed an average increase of 9.4 bushels, over the mixture with no potassium, while the heavy application showed an average difference of 22.7 bushels, and one replication was 31.2



Some clover, but also a lot of sorrel and other weeds, followed oats on the NP-treated area.

bushels higher, exactly double the yield, on the plot treated with complete fertilizer.

As previously stated, clover was "killed out" in the season of 1929 and 1930. This resulted in no provision for a third year crop of timothy in 1931. It was necessary then to substitute the timothy with a crop of oats and peas for hay. This unexpectedly afforded an opportunity to observe the effect of light and heavy dressings of complete and incomplete fertilizer on this crop. The average yields of duplicate plots showed only insignificant increases in yields of the nitrate of soda and superphosphate plots over the check. The plots receiving the light and heavy dressings of complete fertilizer, however, gave increases over the check of 0.66 and 1.28 tons, respectively.



Complete fertilizer brought a luxuriant growth of clover 10 inches high.

A further significant result from the various treatments of fertilizer was brought out in the stand of clover produced after the nurse crop of oats in 1931. On the check plots which received no fertilizer, there was no sign of growth of any plants, with the exception of a few weeds, after the oats were harvested. The bare oat stubble stood out plainly with no growth to cover it.

On the area treated with nitrate of soda and superphosphate, some clover and a good deal of sorrel and other weeds had grown up and partially hid the oat stubble. The stand, however, was far from satisfactory.

On the area treated with complete fertilizer, clover made luxuriant growth and covered the entire area with a strong, healthy stand of clover approximately 10 inches high.

As stated above, definite conclusions cannot be based on one or even two years' results, but the indications point very strongly to the need for fertilization with complete fertilizer under the conditions of this experiment. Certainly the two years' records show that muriate of potash, added to nitrate of soda and superphosphate, very materially increased the yields of the crops under consideration.

Serenity

(*From page* 4)

mas in these days when mankind scoffs at things he once cherished and adored, and when confidence is shattered for no sound reason except warped worldliness?" I asked the country parson.

"If you have read Saint Mark, my friend," replied the minister, "you will recall in the ninth chapter these words: 'and he took a little child and set him in the midst of them.' You may also recall that the first Christmas came when the world was dark and the only conception they had of any Diety was a misty being seated on a cloud surrounded by harpers and crowned in awful majesty. Hence the best way God had to get at the hearts of men was to present his spirit among them as an infant—making the Great as Small as possible so that even the shepherds could understand it."

"From this I infer that our race needs simplicity and a rebirth of homespun ideals to reflect the Christmas spirit truly," I remarked, checking his points as he went on.

"Yes, that is behind what I mean," continued the sky-pilot. "Mankind has done so many wonderful things and has become so cock-sure of its ability to achieve human welfare with science minus religion that simple things are lost to our leaders. My parish is made up of quiet, simple folks for the most part, who think of the Christmas caress as a symbol of God at the humble hearthstone. Their sight is dim toward the Creator in terms of astronomy or metaphysics, and they are baffled by too much scientific complexity. A gentle and joyous Divinity, nestling close to their hearts, is the conception they cherish against discouraging odds of skepticism and misery."

Wrapping a fallen leaf around his finger, the parson persisted in his musings.

"You know there is plenty of wisdom that is not wise, many dogmas that are dingy, and creeds that are cloudy. But deep within the heart of every man, no matter how blasé and varnished-over he has become, there is yet a childish spirit tight hold of him, tugging at him all the time, prodding him with memories of other days

spent with simpler folks in simpler ways. A child is naturally joyful, trustful, and hopeful, believing all things, loving and free from guile. You remember Wordsworth said a lot of beautiful things about the change taking place in mankind from childhood to maturity, and how fast the little things that are truly great slip away from him and are replaced by hard, dogmatic, material philosophy."

"You're O. K., parson," I commented. "Take the 4-H clubs, for instance. I went to many of their summer camps this year, and I never saw them happier and more hopeful than they were in 1931. I guess if we all suddenly got back our youthful spirit and still had our adult experiences, we might sweep all the gloom away in a jiffy."

"Now I am not impractical," continued the preacher. "I am aware that there are mean kids as well as miserable grown-ups; but kids either inherit most of their meanness or catch it like they do scarlet fever. I am talking about the underlying difference between unspoiled, open-minded youth and the canker of maturity."

"Check again, parson," I said. "Men and women have spoiled more kids than God, including the ones over there in the hospital."

"I read in a book recently that the life of God may be like the heart of an unspoiled child and not like a king on a throne, to whom cringing men bow down," surmised the parson. "And we need not simply yearn to be innocent, for that alone is not sufficient to meet a crisis. It strikes me that the Christmas doctrine brings us, not to the child we once were, but to the child we never yet have been."

"Quite true again," said I. "For we often meet old people who retain all the vivid interest and verve of youth and who refuse to mumble in chimney corners, and again we find young folks who do not know that they possess youth until it is too late to celebrate the fact. The symbol of youth may be converted at will into reality, even defying physical handicaps; but the attitude of youth toward the problems of society touches debatable ground.

"With all our futility, super-cleverness, and spiritual paralysis we have not been able to solve the secret of mortal life or glimpse the vistas beyond," I replied. "As skeptics immersed in a sea of scoffing, it has been fashionable to abandon old beliefs and mores once treasured by the people. But the question is what have we substituted for it that gives us any greater comfort?"

"Quite so, friend," answered the dominie. "Though I speak with the tongues of men and of angels and have not charity—you know the rest. And again remember the words: 'For I am persuaded that neither life nor death nor angels nor principalities nor powers nor things present or things to come may rob me of the love that is in Christ the Lord.'"

I SHIFTED around and reached for my crumpled newspaper. "Having built up material wonders and depended solely upon material things, it isn't any wonder that the newspapers print so many scare-heads about bank failures and falling prices," said I, handing him the latest bogey bulletin.

"Nor is it any wonder that government leaders resort to panaceas of financial kinds to keep us from stuffing old socks with savings instead of Christmas presents," answered my companion.

"One trouble is that people fear humiliation because they do not know the meaning of humility," I ventured. "The two words look alike but they mean different things. Humility is something we ought to pack around with us every day in moderate amounts, while humiliation is a sort of false pride coming after rapid jazz-mania."

Rising from his slab, the parson mo-

tioned for me to accompany him toward the manse. He took a list of names from his breast pocket and handed them to me, with a naive comment.

"This list constitutes families and heads of families in my parish who require the most help on Christmas day."

Scanning the sheet I noted with surprise that every name represented people of affluence and importance in the parish. What could the little preacher mean? He sensed my perplexity.

"This community has contributed in a perfunctory way to a budget to support the needy, and so the slumming and dole bringing I am obliged to do amounts to little. And furthermore, our charities are in excellent hands, capable and Christianlike, so that those who gain the Christmas dole will feel as though they had entertained angels instead of prying busy-bodies. Nobody will feel insulted, it being dispensed with tact and warmed with old-time faith."

"Well, why this list then?" was my query.

"I am going out to seek those who gave by proxy and in a sense of frigid duty. I shall also call upon a few who dodge the income tax and are teaching their legatees to escape the inheritance tax if they can. I may visit some of the fellows who encouraged extravagance among wage-earners and reaped enormous profits out of mass consumption. I am going to Nebuchadnezzar, not in behalf of Lazarus at the beggar's gate, but to teach boyhood comradeship to those who hoard their marbles. They have been playing skin games at 'keeps' and their draw-strings are fastened tight around bulging bags of moss agates and glass shooters. When they began making rings in the earth with crooked sticks, they played for fun, but they have turned out to be miserly misfits who forget that most marbles are made of clay."

"Going to talk farm relief or unemployment insurance, moratoriums on interest or something like that?" I asked.

"Not by a jugful," hotly replied the preacher, returning the list of Mammonites to his pocket. "Leave that to Congress and the economists, politicians seeking another chance at the tax roll, and high-brow magazines. I am too good a salesman to invite disaster with heavy resistance. I am out to heal hearts that need repair and alignment, not to swipe gasoline or get under steam on somebody else's coal."

"Then I suppose you are not going to try to induce the hoarders to divide their marbles with the fellows who got licked playing keeps?" I smiled.

"No, indeed; but I sincerely hope to get them to return to the game for companionship and play square, so that the old school ground will reecho again to the tumult of ardor and joy," replied the parson.

AND so it came to pass that in this parish the Christmas time was observed by the people as though they were once more possessed of the serenity and peace of mind which is always the attribute of unspoiled youth. Love drove the ledger away from the Christmas festival, and when men left the factories and offices, they brought no foolish worries home to brood about. Selfish ambition was not allowed to cloud the pleasant reality of life around the happy hearth. And out of it grew a richer meaning of human existence than any that had prevailed before.

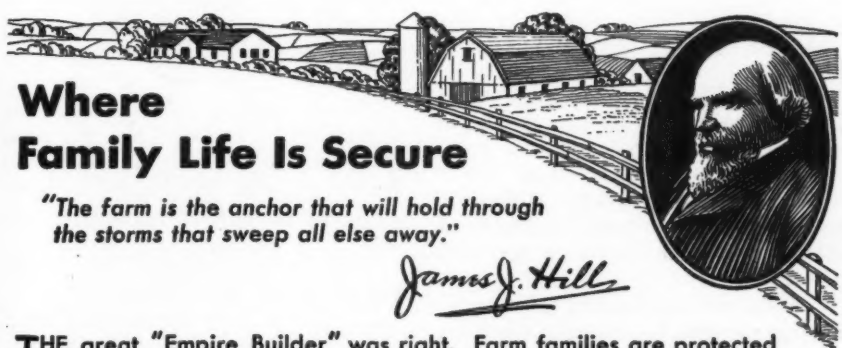
That calmness and joy of life that we see in our children arises, we do not deny, from a certain economic security; but the confidence and hope, the morning gladness and the evening contentment that marks all normal children has its source in something far more potent than father's job and the state of the nation.

In the midst of some heated moment or some perplexing business reverie, or at some hasty word of despair uttered in the presence of children, how ashamed we instantly feel. They scan us with a sort of wistful wonderment, as though we elders had broken some charm of childhood, or had violated the sanctity of the precious peace of home.

At once we shake away the lethargy of mundane madness and pick up the thread of some game they are playing, so as to get once more the thrill of Christmas from the standpoint of the child. We suddenly take keen interest in how paper dolls are cut from old magazines, how crude drawings are made on waste paper from the office, and how a fellow ought to sharpen a pair of skates. We peep out at Mother in deft and patient tasks and sniff expectantly at the goodies being prepared for the family dinner. We discuss the songs and games that are so all-important at school and help sister polish up rough places in her Christmas recitation. In a jiffy the air is clear again and we are all children of the Kingdom together, thrusting Fear out into the snow drifts and drawing together in the sense of serenity that means more to family men than its counterpart, responsibility.

And why not, at least for a fortnight, live in full realization of the here and now and those precious things that time alone can rob us of? Someday the childish voices will be only a memory and the toys will be scattered to the realm of oblivion. *This* moment of love and life is what we have earned and the crown of our happiness.

Let us, then, fill the Christmas cup of merriment, quaff it ourselves with a rousing toast to Mother and the kids, pass it on to others if there still be a portion left, and go to sleep at last resolved to be radiant and joyful even if we don't hang up our darned old stockings.



Where Family Life Is Secure

"The farm is the anchor that will hold through the storms that sweep all else away."

James J. Hill

THE great "Empire Builder" was right. Farm families are protected from the storms of adversity that may leave others homeless and destitute. This is especially true when the farm is soundly financed.

During fourteen years, the twelve Federal Land Banks have promoted the security of farm homes. With their aid, more than half a million farmers have replaced troublesome short-term mortgages with long-term "disappearing" mortgages that eventually bring complete freedom from debt.

FEDERAL LAND BANKS

Springfield, Mass. — Baltimore, Md. — Columbia, S. C. — Louisville, Ky.
St. Paul, Minn. — St. Louis, Mo. — New Orleans, La. — Omaha, Neb.
Wichita, Kan. — Houston, Tex. — Spokane, Wash. — Berkeley, Cal.

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"This community has contributed in a perfunctory way to a budget to support the needy, and so the slumming and dole bringing I am obliged to do amounts to little. And furthermore, our charities are in excellent hands, capable and Christianlike, so that those who gain the Christmas dole will feel as though they had entertained angels instead of prying busy-bodies. Nobody will feel insulted, it being dispensed with tact and warmed with old-time faith."

"Well, why this list then?" was my query.

"I am going out to seek those who gave by proxy and in a sense of frigid duty. I shall also call upon a few who dodge the income tax and are teaching their legatees to escape the inheritance tax if they can. I may visit some of the fellows who encouraged extravagance among wage-earners and reaped enormous profits out of mass consumption. I am going to Nebuchadnezzar, not in behalf of Lazarus at the beggar's gate, but to teach boyhood comradeship to those who hoard their marbles. They have been playing skin games at 'keeps' and their draw-strings are fastened tight around bulging bags of moss agates and glass shooters. When they began making rings in the earth with crooked sticks, they played for fun, but they have turned out to be miserly misfits who forget that most marbles are made of clay."

"Going to talk farm relief or unemployment insurance, moratoriums on interest or something like that?" I asked.

"Not by a jugful," hotly replied the preacher, returning the list of Mammonites to his pocket. "Leave that to Congress and the economists, politicians seeking another chance at the tax roll, and high-brow magazines. I am too good a salesman to invite disaster with heavy resistance. I am out to heal hearts that need repair and alignment, not to swipe gasoline or get under steam on somebody else's coal."

"Then I suppose you are not going to try to induce the hoarders to divide their marbles with the fellows who got licked playing keeps?" I smiled.

"No, indeed; but I sincerely hope to get them to return to the game for companionship and play square, so that the old school ground will reecho again to the tumult of ardor and joy," replied the parson.

AND so it came to pass that in this parish the Christmas time was observed by the people as though they were once more possessed of the serenity and peace of mind which is always the attribute of unspoiled youth. Love drove the ledger away from the Christmas festival, and when men left the factories and offices, they brought no foolish worries home to brood about. Selfish ambition was not allowed to cloud the pleasant reality of life around the happy hearth. And out of it grew a richer meaning of human existence than any that had prevailed before.

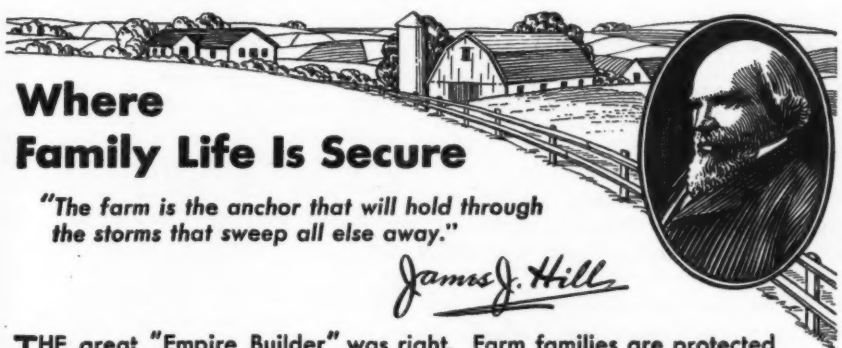
That calmness and joy of life that we see in our children arises, we do not deny, from a certain economic security; but the confidence and hope, the morning gladness and the evening contentment that marks all normal children has its source in something far more potent than father's job and the state of the nation.

In the midst of some heated moment or some perplexing business reverie, or at some hasty word of despair uttered in the presence of children, how ashamed we instantly feel. They scan us with a sort of wistful wonderment, as though we elders had broken some charm of childhood, or had violated the sanctity of the precious peace of home.

At once we shake away the lethargy of mundane madness and pick up the thread of some game they are playing, so as to get once more the thrill of Christmas from the standpoint of the child. We suddenly take keen interest in how paper dolls are cut from old magazines, how crude drawings are made on waste paper from the office, and how a fellow ought to sharpen a pair of skates. We peep out at Mother in deft and patient tasks and sniff expectantly at the goodies being prepared for the family dinner. We discuss the songs and games that are so all-important at school and help sister polish up rough places in her Christmas recitation. In a jiffy the air is clear again and we are all children of the Kingdom together, thrusting Fear out into the snow drifts and drawing together in the sense of serenity that means more to family men than its counterpart, responsibility.

And why not, at least for a fortnight, live in full realization of the here and now and those precious things that time alone can rob us of? Someday the childish voices will be only a memory and the toys will be scattered to the realm of oblivion. *This* moment of love and life is what we have earned and the crown of our happiness.

Let us, then, fill the Christmas cup of merriment, quaff it ourselves with a rousing toast to Mother and the kids, pass it on to others if there still be a portion left, and go to sleep at last resolved to be radiant and joyful even if we don't hang up our darned old stockings.



Where Family Life Is Secure

"The farm is the anchor that will hold through the storms that sweep all else away."

James J. Hill

THE great "Empire Builder" was right. Farm families are protected from the storms of adversity that may leave others homeless and destitute. This is especially true when the farm is soundly financed.

During fourteen years, the twelve Federal Land Banks have promoted the security of farm homes. With their aid, more than half a million farmers have replaced troublesome short-term mortgages with long-term "disappearing" mortgages that eventually bring complete freedom from debt.

FEDERAL LAND BANKS

Springfield, Mass.	St. Paul, Minn.	Wichita, Kan.
Baltimore, Md.	St. Louis, Mo.	Houston, Tex.
Columbia, S. C.	New Orleans, La.	Spokane, Wash.
Louisville, Ky.	Omaha, Neb.	Berkeley, Cal.

WHO GOT THE JOB?

A business man advertised in a recent evening paper for an office boy. The next morning, on his arrival at the office, he found at least fifty boys in line.

Just as he was about to start examining the applicants, his stenographer handed him a card, on which was scrawled:

"Don't do anything until you see me. I'm the last kid in the line, but, I'm telling you, I'm there with the goods."

Colored Mammy: "Ah wants a ticket fo' Vi'ginia."

Ticket Agent: "What part of Virginia?"

Colored Mammy: "Fo' all ov Vi'ginia, o' co'se. Da's huh a-settin' on dat suit case."

A small boy, leading a donkey, passed by an army camp. A couple of soldiers wanted to have some fun with the lad.

"What are you holding on to your brother so tight for, sonny?" asked one of them.

"So he won't join the army," the youngster replied.

IMMATERIAL TO HIM

A fat woman elbowed her way through the crowd, jabbing first one person and then another. Finally she gave one nearby man an unusually hard thump, and asked: "I say, does it make any difference which car I take to Mount Royal Cemetery?"

"Not to me, madam," was the reply.

STRANGE NIGGER

The day before she was to be married the old negro servant came to her mistress and entrusted her savings to her keeping.

"Why should I keep it? I thought you were going to get married," said the mistress.

"So I is, Missus, but do you s'pose I'd keep all dis money in de house wid dat strange nigger?"

—*Between Calls.*

Teacher "What's the interest on a thousand dollars for one year at two per cent? . . . Ikey, pay attention!"

Ikey: "For two per cent I'm not interested."—*Ohio Motorist.*

He was a bit shy, and after she had thrown her arms around him and kissed him for bringing her a bouquet of flowers, he arose and started to leave.

"I am sorry I offended you," she said.

"Oh, I'm not offended," he replied, I'm going for more flowers."

—*Capper's Weekly.*

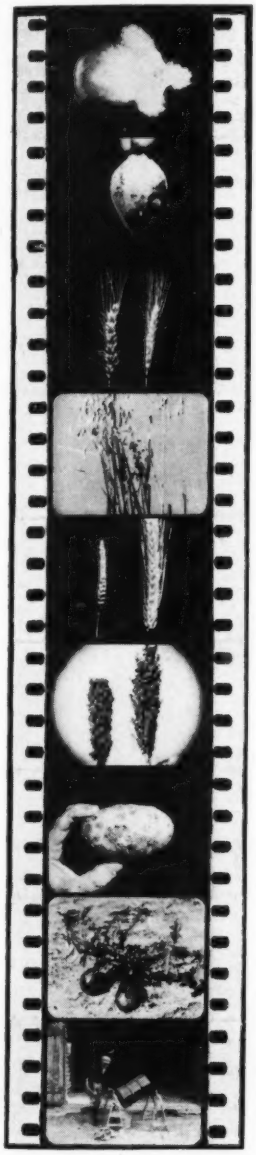
It was announced in one of our leading magazines that "Knee-length skirts had reduced street car accidents fifty per cent."

"Wouldn't it be nice if accidents could be prevented entirely?"

JUST BEFORE THE BATTLE

Mrs. O'Brien (concluding argument): "Every time I looks at you, Mrs. 'Iggins, I feel I'm doin' the government out o' entertainment tax."

Educational Motion Pictures



on Seed-borne Diseases— Available for Your Use

The increasing economic importance of seed-borne plant diseases in relation to farm profits emphasizes the need of acquainting both students in agriculture and practical farmers with the disease symptoms on various crops; the losses caused by such diseases; the methods of combating them; and the profits to be obtained by controlling or eliminating them.

To meet this need we have prepared five two-reel motion picture films, one each on the following crops: Cereals, Corn, Cotton, Potatoes and Vegetables; also a one-reel picture on the Brown-Patch diseases of grass turf.

These pictures are educational in scope. They point out the tremendous losses caused by seed-borne diseases; show the typical appearance on the plant of many important surface seed-borne diseases; picture the effects of diseases on germination, stands and yields; and illustrate easy, quick methods for controlling such diseases.

Of special interest are the scenes of Gibberella developing on a kernel of corn; plants actually growing from treated and untreated diseased seed; marketing of smutty wheat, including inspection and dockage; the life history of smut; the 1930 national corn husking contest; the county agent's service to the grower; illustrations of the results of Agricultural Experiment Stations' tests in combating seed-borne diseases, including comparative yields from treated and untreated seed.

These films are available for use in your classes, at Farmers' week or for farm meetings. They are lent to you free of all charges. Write us for description of films and complete details on the condition for borrowing these films.

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105 HUDSON STREET **NEW YORK, N. Y.**

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SWEET POTATOES yielding at the rate of 300 bushels remove from each acre 82.5 pounds of actual potash, equal to 165 pounds of muriate of potash, or 460 pounds of fertilizer containing 18% potash.

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